Thunder h2000M /// S3992-E

Version 1.0

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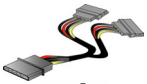
Check the box contents!

The retail motherboard package should contain the following:

1x Thunder h2000M motherboard

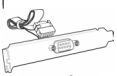
1x 34-Pin floppy drive cable

4 x SATA cable


2 x S-ATA Power cable

1 x Ultra-DMA-100/66 IDE cable

1 x USB2.0 cable


1 x COM Port cable

1 x Thunder h2000M User's Manual

1 x Thunder h2000M Quick Reference Guide

1 x TYAN driver CD

1 x I/O shield

2 x CPU Retention Frame and Back Plate

If any of these items are missing, please contact your vendor/dealer for replacement before continuing with the installation process.

NOTE

Chapter 1: Introduction

1.1 - Congratulations

You have purchased one of the most powerful server solutions available. The Thunder h2000M (S3992-E) is a high-end server motherboard, based on the ServerWorks BCM5780 & BCM5785 chipsets. It also includes the SMSC SCH4307 Super I/O and SMSC EMC6D103 Hardware Monitoring chipsets.

This motherboard is designed to support up to two AMD Opteron™ Rev. F 2000 Series / Barcelona Quad core processors and DDRII 667/533 memory. The S3992-E is ideal for CPU, memory, and network intensive applications required in the HPC and clustering environments.

Remember to visit TYAN's Website at http://www.tyan.com. There you can find information on all of TYAN's products with FAQs, online manuals and BIOS upgrades.

1.2 - Hardware Specifications

Processors
- Two uPGA 1207-pin ZIF sockets
- Supports up to two AMD Opteron™ Rev. F 2000 Series Santa Rosa Dual core processors, and Barcelona Quad core processors
- Supports AMD dual dynamic power feature
- Integrated 128-bit DDRII memory controller

Chipset
- ServerWorks BCM5780 (HT2000) + BCM5785 (HT1000) chipsets
- SMSC SCH4307 Super I/O chip*

*** S3992 and S3992-E are with different Super I/O chips.**

Memory
- 128-bit dual channel memory bus
- Total sixteen (16) 240-pin 1.8V DDRII DIMM sockets (8 on CPU1 and 8 on CPU2)
- Supports up to DDRII 667MHz
- Registered, ECC module supported

Integrated Video Controller
- ATI ES1000 controller
- 32MB DDR frame buffer

Integrated Enhanced IDE Controller
- Single-channel master mode supports up to two IDE devices
- Supports IDE drives and ATAPI-compliant devices

Integrated SATA Controllers
- Supports four SATA ports at 1.5 Gb/s with NCQ (BCM5785 Chipset)
- RAID 0/1/5/10 supported

BIOS
- AMI BIOS on 8Mbit LPC Flash ROM
- ACPI 2.0 and SRAT support
- PXE via Ethernet, USB device boot
- SMBIOS 2.3.1, BBS 1.1 compliant
- Headless Operation via serial console redirect
- 48-bit LBA Support

System Management
- Two (2) EMC6D103 hardware monitoring IC
- Eight (8) 3+1 fan headers support tachometer monitoring, six (6) of them with smart FAN control
- Temperature and voltage monitoring
- Watchdog timer support

Expansion Slots
- Two (2) PCI Express X16 slots (each w/ x8 signal)
- Two (2) PCI-X 133/100MHz slots
- One (1) PCI-X 100MHz slot
- One (1) PCI 32-bit/33MHz, v2.3 compliant slot
- One (1) TYAN "TARO" SO-DIMM socket

Integrated I/O
- One floppy connector
- One IDE connector
- Four SATA connectors
- Four USB2.0 ports (2 at rear, 2 via cable)
- Two COM ports (1 at rear, 1 via cable)
- Tyan 2 x 9 front panel pin header
- Tyan 2 x 6 front panel pin header for LAN/ID LED
- Tyan 2 x 7 pin header (2.0mm) for FAN tachometer and PWM
- 2 x 25 connector for optional TYAN IPMI SMDC

Back Panel I/O Ports
- Stacked PS/2 Mouse & Keyboard ports
- Stacked 2 USB ports and 1 10/100 RJ45 port
- One 9-pin COM port
- One 15-pin VGA connector
- Two side-by-side RJ-45 ports

Form Factor
- Extended ATX footprint (13" x 12")
- EPS12V/ATX 12V universal power connectors

Integrated LAN Controllers
- Dual GbE LAN (from BCM 5780)
  - Embedded in BCM5780
  - Two 10/100/1000 RJ-45 LAN ports w/LED
- One Intel i82551 QM fast Ethernet controller
  - One 10/100 RJ-45 LAN port w/LED
  - Operating on 32bit/33MHz PCI bus

Optional Modules
- M3291, IPMI 2.0 Remote System Mgmt card

- Renesas H8S2167 BMC controller
- BT, KCS, Logging support
- IPMI-over-LAN
- Remote power on/off and reset

- M7901/M7902, Ultra 320 SCSI TARO card

- Adaptec AIC-7901/7902 single/dual-channel Ultra320 SCSI controller
- Adaptec Host RAID 0, 1, 10 supported

- M9000 SAS/SATA II TARO card

- Adaptec AIC-9405/9410 SAS controller
- Supports up to 4-port (M9000-5) and 8-port (M9000-10) SAS & SATA running at 3.0Gb/s
- Adaptec HostRAID 0, 1 & 10 supported

Power
- Onboard dual 4-phase VRM
- EPS12V/SSI v3.51 (24+8) power connectors

Regulatory
- FCC Class B (DoC)
- European Community CE (DoC)

Chapter 2: Board Installation

Precautions: The Thunder h2000M supports SSI, EPS12V type power supplies (24pin + 8pin) and will not operate with any other types. For proper power supply installation procedures see page 36.

DO NOT USE ATX 2.x or ATXGES power supplies as they will damage the board and void your warranty.

How to install our products right… the first time

The first thing you should do is reading this user's manual. It contains important information that will make configuration and setup much easier. Here are some precautions you should take when installing your motherboard:

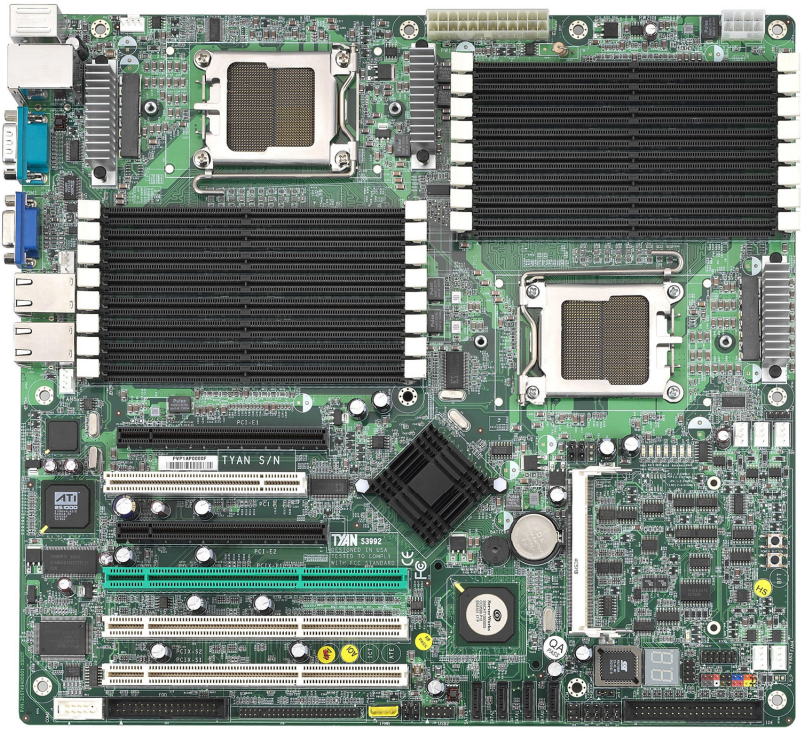
(1) Ground yourself properly before removing your motherboard from the antistatic bag. Unplug the power from your computer power supply and then touch a safely grounded object to release static charge (i.e. power supply case). For the safest conditions, TYAN recommends wearing a static safety wrist strap.
(2) Hold the motherboard by its edges and do not touch the bottom of the board, or flex the board in any way.
(3) Avoid touching the motherboard components, IC chips, connectors, memory modules, and leads.
(4) Place the motherboard on a grounded antistatic surface or on the antistatic bag that the board was shipped in.
(5) Inspect the board for damage.

The following pages include details on how to install your motherboard into your chassis, as well as installing the processor, memory, disk drives and cables.

NOTE	**DO NOT APPLY POWER TO THE BOARD IF IT HAS BEEN DAMAGED.**

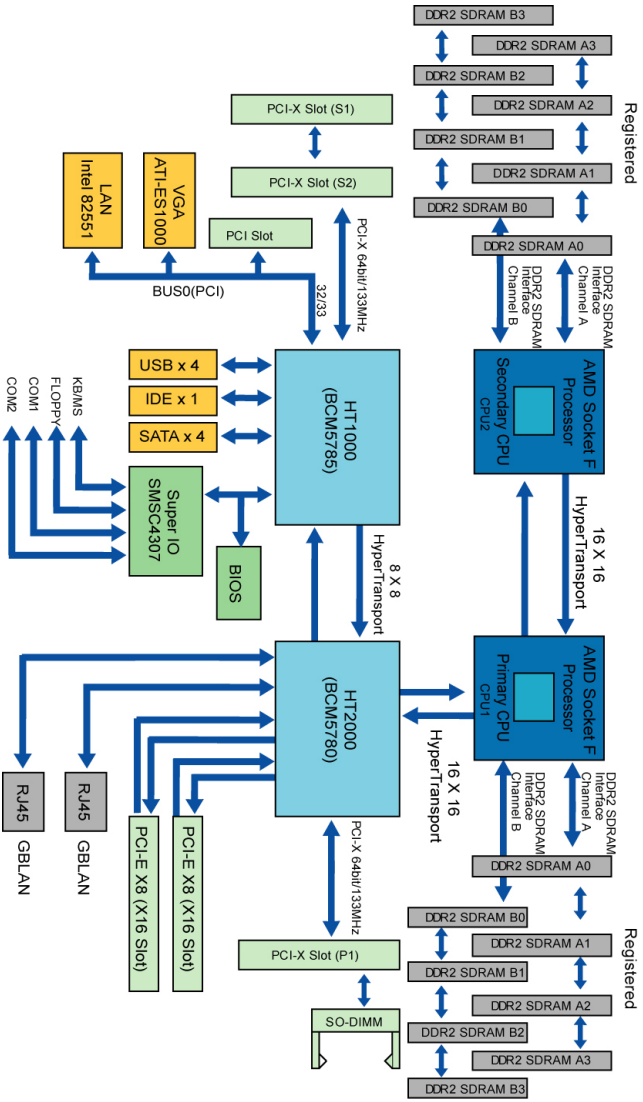
2.1- Board Image

This picture is representative of the latest board revision available at the time of publishing. The board you receive may or may not look exactly like the above picture.



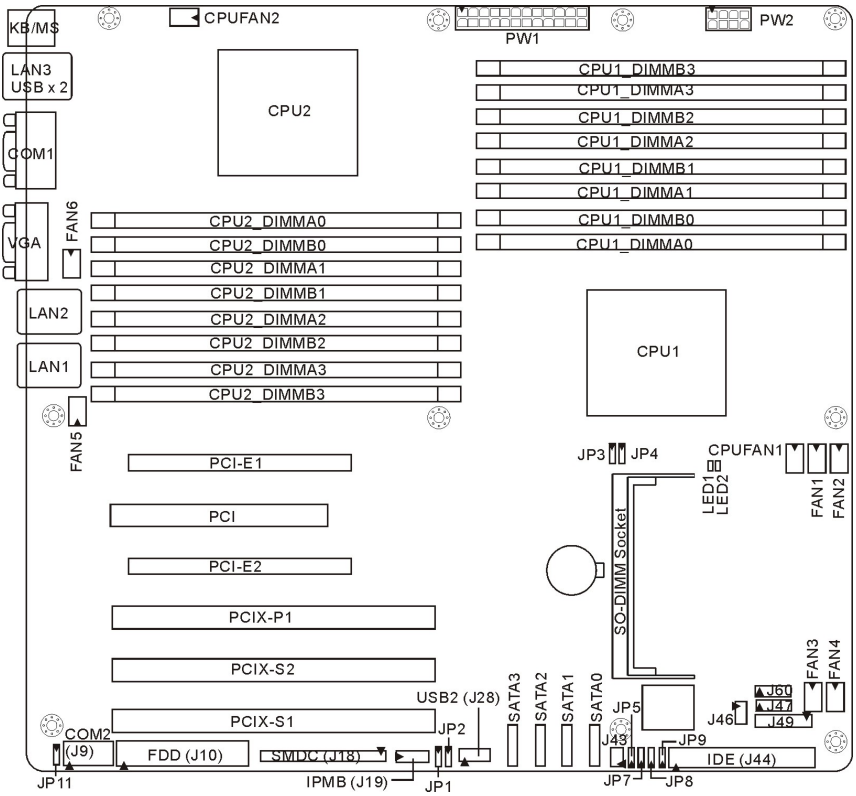
The following page includes details on the vital components of this motherboard.

2.2 - Block Diagram



Thunder h2000M (S3992-E) Block Diagram

2.3 - Board Parts, Jumpers and Connectors

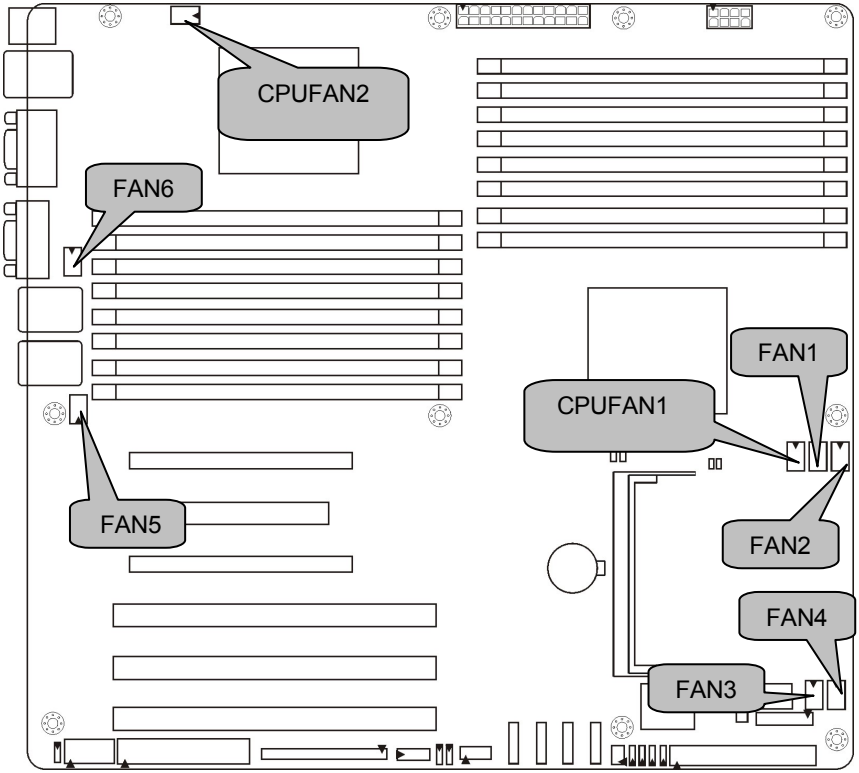


This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

Jumper Legend

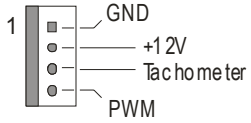
	OPEN - Jumper OFF, without jumper cover
	CLOSED – Jumper ON, with jumper cover

Jumper/Connector	Function
FAN5/FAN6	4-pin Fan Connector
CPUFAN1/CPUFAN2/FAN1/ FAN2/FAN3/FAN4	4-pin Fan Connector with Speed Control
J19	IPMB Connector
J28	USB Front Panel Connector
J30/J39/J40/J41	SATA Connectors
J47	LAN & ID LED and ID Switch Connector
J49	Front Panel Header
JP1/JP2	SMDC/ASF2.0 Select Jumper (Close 1-2) Default, support ASF 2.0 (Close 2-3) support SMDC card
JP3	VGA Enable/Disable Jumper (Close 1-2) Default, enabled (Close 2-3) Disabled
JP4	LAN3 Enable/Disable Jumper (Close 1-2) Default, enabled (Close 2-3) Disabled
JP5 (S1/S2) / JP8 (P1)	PCI-X Mode Select Jumper (Close 1-2) Default, Based on Card (Close 2-3) Force to run at PCI mode (only 66 or 33 MHz)
JP7 (S1/S2) / JP9 (P1)	PCI-X Frequency Select Jumper (Close 1-2) Default, based on Card (Close 2-3) 100MHz or less
JP11	Clear CMOS Jumper (Close 1-2) Default (Close 2-3) Clear CMOS
LED1	Standby Power LED
LED2	Power On LED
J43/J46/J60	Reserved for OEM only

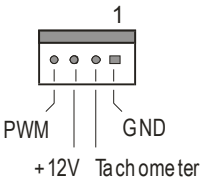

CPUFAN2
FAN6
FAN1
CPUFAN1
FAN5
FAN2
FAN4
FAN3

FAN1~4/CPUFAN1~2: 4-pin Fan Connector with Speed Control

CPUFAN1/FAN1~4



CPUFAN2



Use these headers to connect the cooling fans to the motherboard to keep the system stable and reliable.

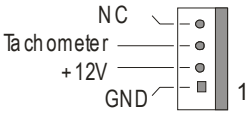
This connector supports the tachometer monitoring and auto fan speed control.

Pin 1	Pin 2	Pin 3	Pin 4
GND	+12V	Tachometer	PWM

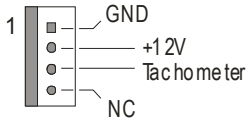
J13: CPUFAN2 J48: CPUFAN1 J50: FAN3
J51: FAN1 J56: FAN4 J57: FAN2

FAN5/FAN6: 4-pin Fan Connector

FAN5



FAN6

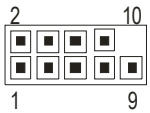


Use these headers to connect cooling fans to the motherboard to keep the system stable and reliable.

Pin 1	Pin 2	Pin 3	Pin 4
GND	+12V	Tachometer	NC

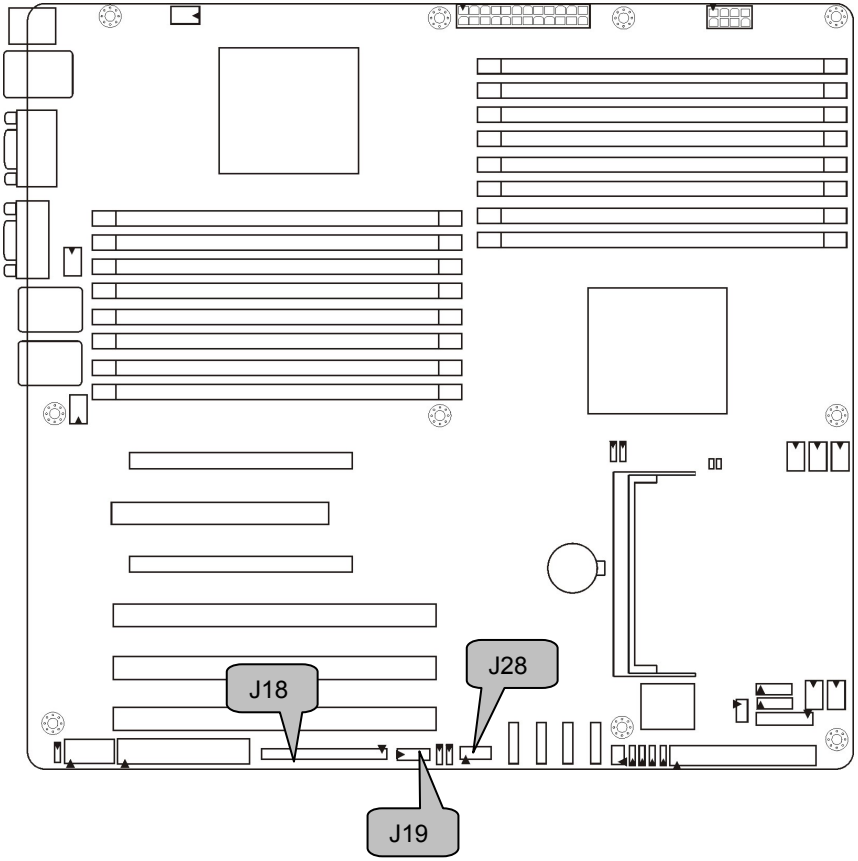
J7: FAN5 J8: FAN6

J9: COM2 Header

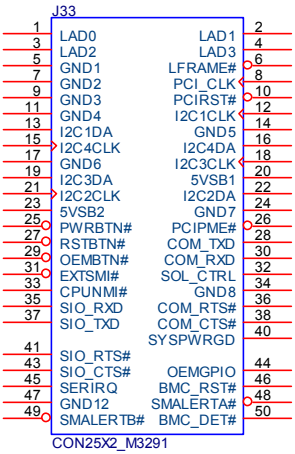


Use these pin definitions to connect a port to COM2.

Signal	Pin	Pin	Signal
DCD	1	2	DSR
RXD	3	4	RTS
TXD	5	6	CTS
DTR	7	8	RI
GND	9	10	KEY

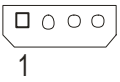

J18
J28
J19

J18: SMDC Connector



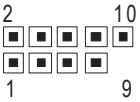
For connection with Tyan Server Management Daughter Card (SMDC). The SMDC connector is only compatible with Tyan M3291 (SMDC).

J19: IPMB Pin Header



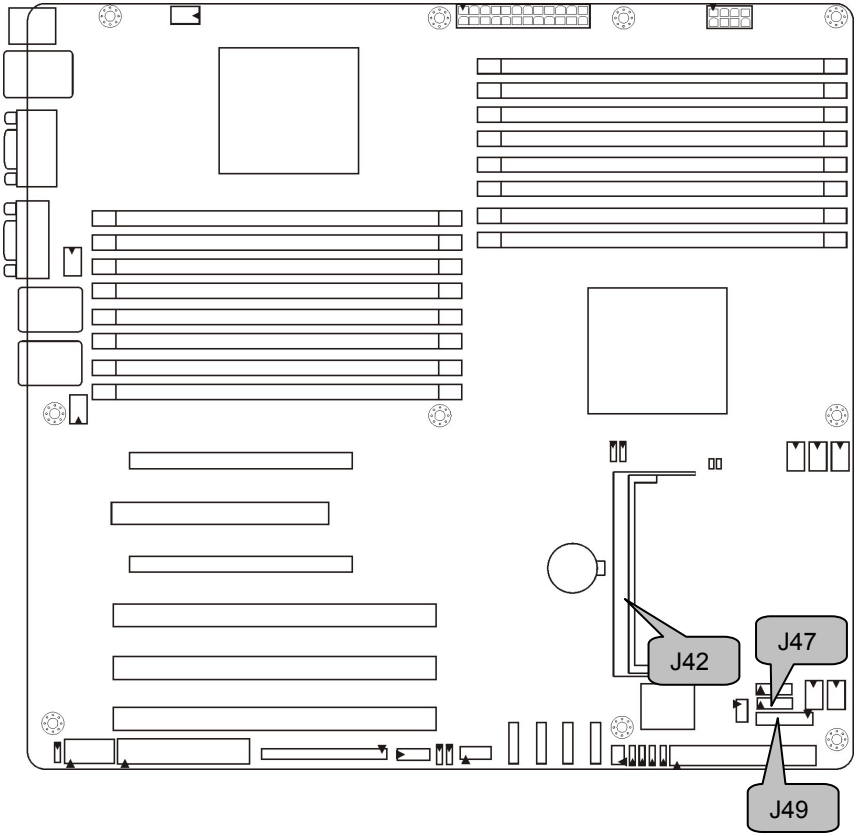
Pin 1	IPMB DATA	Pin 2	GND
Pin 3	IPMB CLK	Pin 4	NC

J28: USB Front Panel Header



Use this header to connect to front panel USB connector.

Signal	Pin	Pin	Signal
USBPWR	1	2	USBPWR
USB3-	3	4	USB4-
USB3+	5	6	USB4+
GND	7	8	GND
KEY	9	10	GND


J42
J47
J49

J42: SO-DIMM Socket

Connect SAS/SATA II Daughter Card (compatible with Tyan M9000-10, M7901/7902 Ultra 320 SCSI “TARO” card).

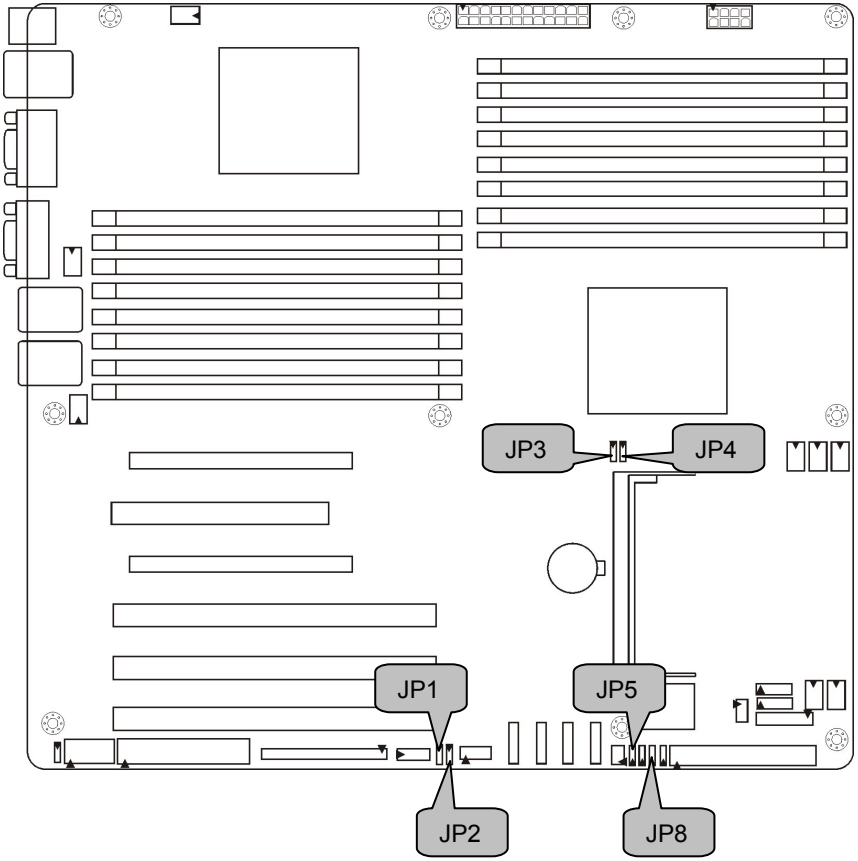
J47: LAN & ID LED and ID Switch Connector

Use these pin definitions to connect a port to LAN & ID LED and ID Switch.

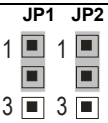
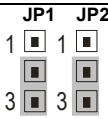
Signal	Pin	Pin	Signal
LAN1 LED+	1	2	LAN1 LED-
LAN2 LED+	3	4	LAN2 LED-
LAN3 LED+	5	6	LAN3 LED-
ID LED+	7	8	ID LED1-
ID S/W+	9	10	ID S/W-
NC	11	12	KEY

J49: Front Panel Header

The motherboard provides one front panel header for electrical connection to the front panel switches and LED’s.


JP3
JP4
JP1
JP5
JP2
JP8

JP1/JP2: SMDC/ASF2.0 Select Jumper

	(Default) - Support ASF2.0
	Support SMDC card

JP3: VGA Enable/Disable Jumper

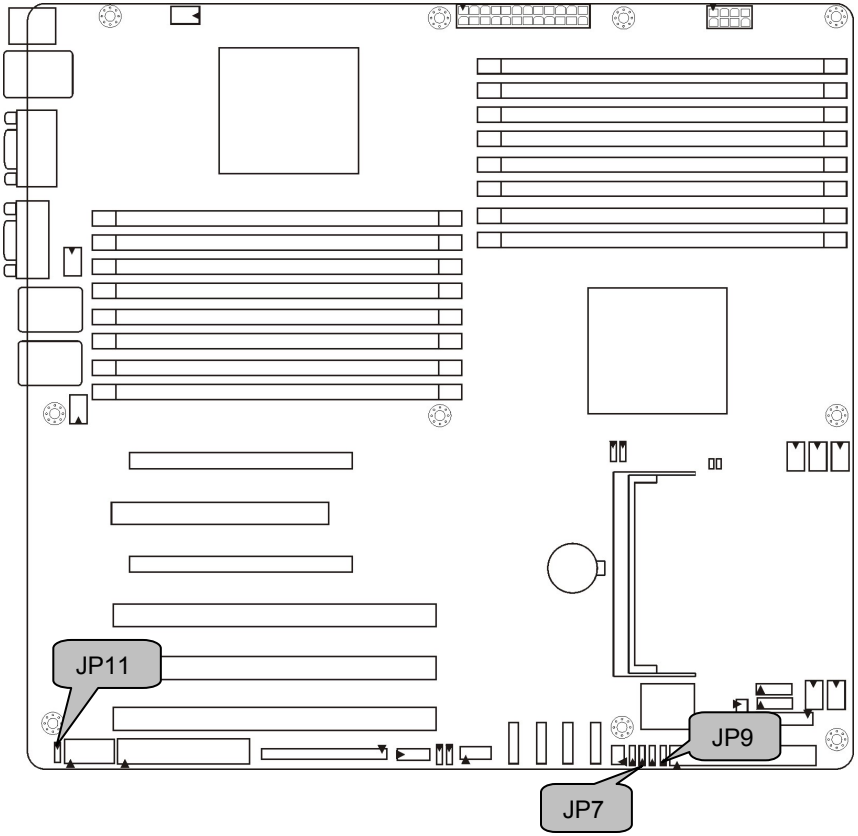
	(Default) - Enable VGA
	Disable VGA

JP4: LAN3 Enable/Disable Jumper

	(Default) - Enable LAN3 (Intel 82551)
	Disable LAN3

JP5: S1/S2 PCI-X Mode Select Jumper
JP8: P1 PCI-X Mode Select Jumper

	(Default) - Based on card
	Force to run at PCI mode (only 66 or 33 MHz)


JP11
JP9
JP7

JP7: S1/S2 PCI-X Frequency Select Jumper
JP9: P1 PCI-X Frequency Select Jumper

	(Default) - Based on card
	Force to run at 100MHz or less

JP11: Clear CMOS Jumper

Clear	Use this jumper when you have forgotten your system/setup password or need to clear the system BIOS settings. How to clear the CMOS data - Power off system and **disconnect the power supply from the AC source** - Use jumper cap to close Pin 2 and 3 for several seconds to Clear CMOS - Replace jumper cap to close Pin 1 and 2 Reconnect the power supply to the AC source - Power on system
Normal (Default)	

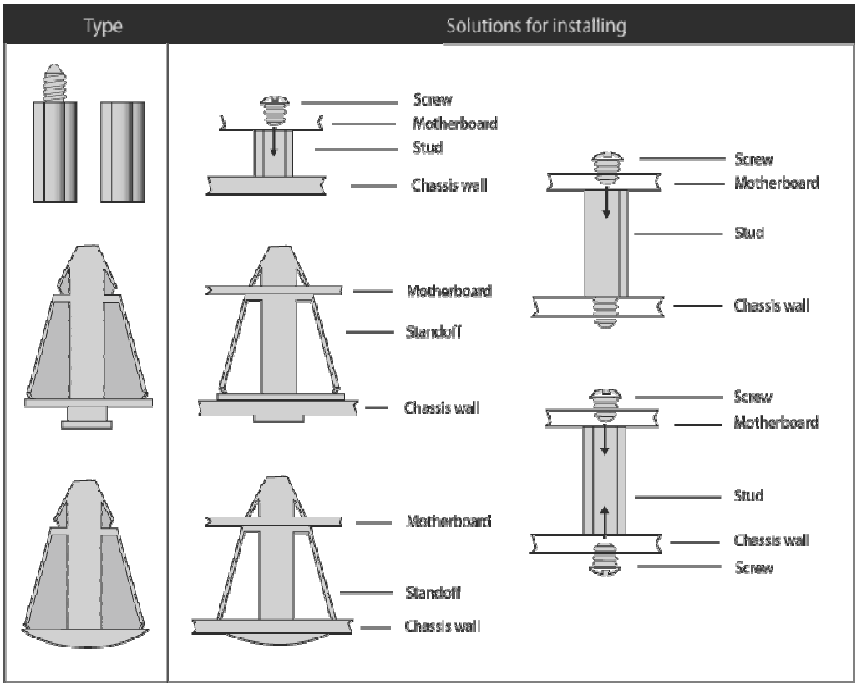
2.4 - Tips on Installing Motherboard in Chassis

Before installing your motherboard, make sure your chassis has the necessary motherboard support studs installed. These studs are usually metal and are gold in color. Usually, the chassis manufacturer will pre-install the support studs. If you are unsure of stud placement, simply lay the motherboard inside the chassis and align the screw holes of the motherboard to the studs inside the case. If there are any studs missing, you will know right away since the motherboard will not be able to be securely installed.

Some chassis' include plastic studs instead of metal. Although the plastic studs are usable, TYAN recommends using metal studs with screws that will fasten the motherboard more securely in place.

Below is a chart detailing what the most common motherboard studs look like and how they should be installed.

Mounting the Motherboard



2.5 - Installing the Processor(s)

Your S3992-E supports the latest processor technologies from AMD. Check the TYAN website for latest processor support:

http://www.tyan.com

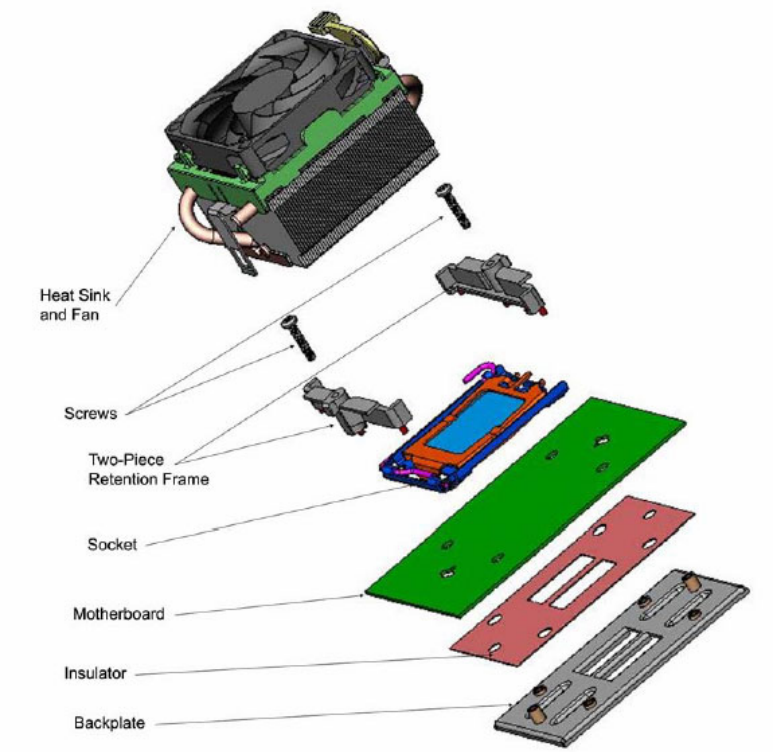


Figure 1. Exploded View of Thermal Solution AMD PIB Platforms based on AMD Socket F Processor

Back plate Assembly

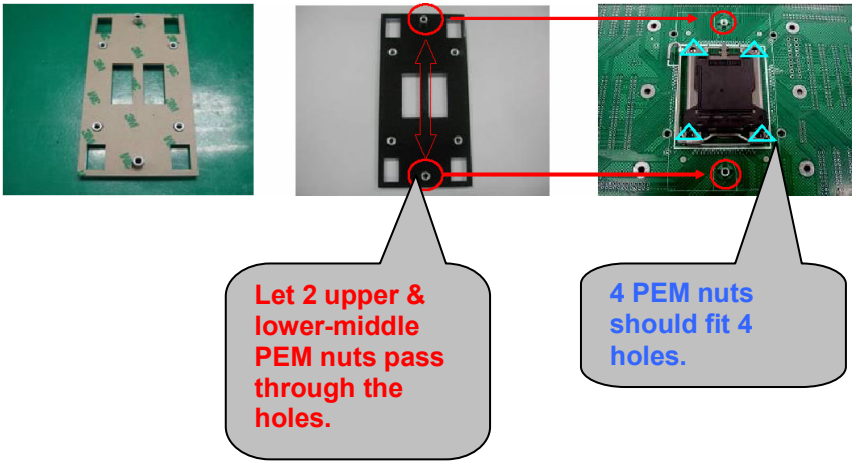
The back plate is mounted on the backside of the motherboard and enhances local stiffness to support shock and vibration loads acting on the heat sink. The back plate assembly prevents excessive motherboard warpage in the area near the processor. Without a back plate, excessive warpage could cause serious damage to electrical connections of the processor socket and integrated circuit packages surrounding the processor. The back plate also serves as a stiffener plate for the LGA socket.

While doing the installation, be careful in holding the components. Follow these instructions to install your back plate:

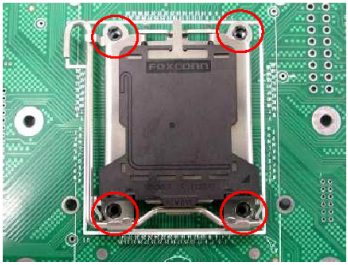
1. Remove the release liner from the back plate.

2. Align the PEM nuts on the back plate to the holes on the reverse side of the PCB.

3. First, insert the taller upper & lower middle PEM nuts through the holes of the PCB. The remaining four shorter PEM nuts should automatically fit the 4 holes on the PCB as shown in the following pictures.

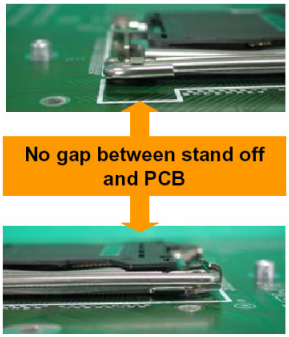


4. Locate four screw holes on socket and screw the socket to the PCB board.



NOTE: Do not assemble CPU before securing socket with screws.

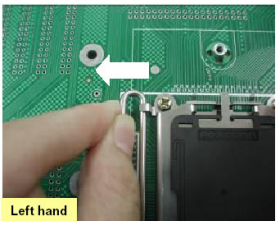
5. Inspect Socket F assembly to PCB. The Socket F must be tightly attached onto the PCB. There must NOT be any gap between stand off the PCB.

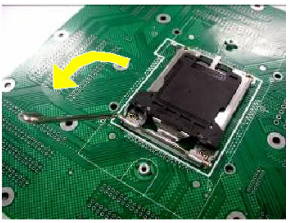


Processor Installation

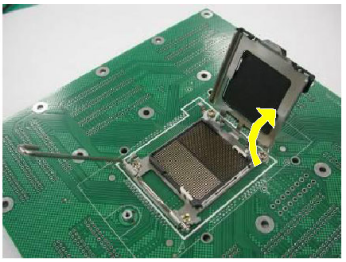
The processor should be installed carefully. Make sure you are wearing an antistatic strap and handle the processor as little as possible.
Follow these instructions to install your processor:

1. Place the PCB such that the socket cam side faces you. Make sure the lever hook is on your top-left side.
2. Use your left thumb and forefinger to hold the lever hook, then pull it to the left side to clear the retention tab.
3. Rotate the lever to a fully open position.

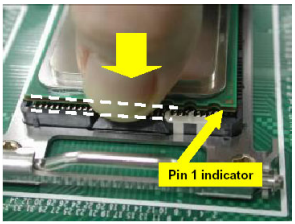


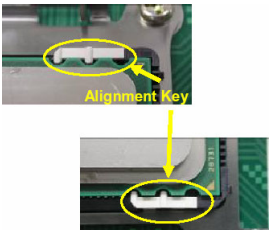


4. Lift the load plate to a fully open position.



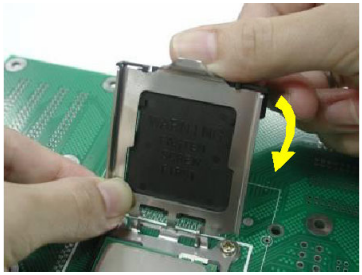
5. Locate the Pin 1 indicator of the package. Align the package with the socket and carefully insert the package into the socket with vertical motion only. Vertically check if the CPU is seated well in the socket housing. If not, take out the CPU, with vertical motion only, and repeat the above steps.

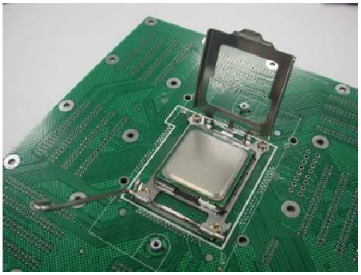




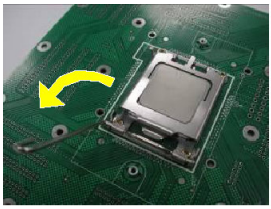
NOTE: The alignment keys must be located in the notches of the package.

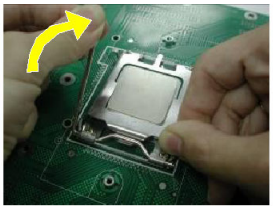
6. Remove the PnP cap. Use your left hand to hold the load plate. Then use your right thumb to remove the PnP cap from the load plate. With the package in the socket, the PnP cap removal process will not damage the contacts.





7. Close the socket. Rotate the load plate onto the package lid. Engage the load lever while pressing down lightly onto the load plate. Secure the lever near the hook end under the retention tab.



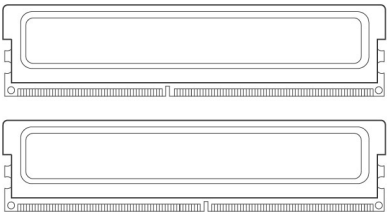


8. Repeat this procedure for the second processor if necessary.

2.6 - Installing the Memory

Before installing memory, ensure that the memory you have is compatible with the motherboard and processor. Only DDR2-667/533/400 DIMM modules are required. Check the TYAN Web site at: **www.tyan.com** for details of the type of memory recommended for your motherboard.

The following diagram shows common types of DDR2 memory modules.



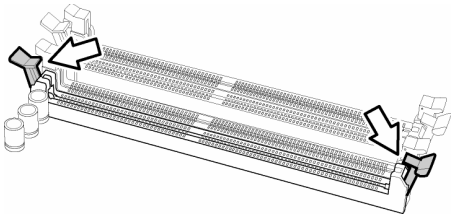
Key points to note before installing memory:

- Only **DDR2 667/533 /400 Registered ECC/non-ECC** memory modules are supported.
- All installed memory will automatically be detected and no jumpers or settings need changing.

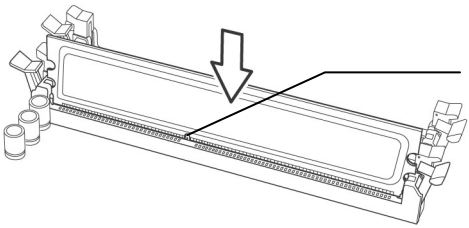
Memory Installation Procedure

Follow these instructions to install memory modules into the S3992-E.

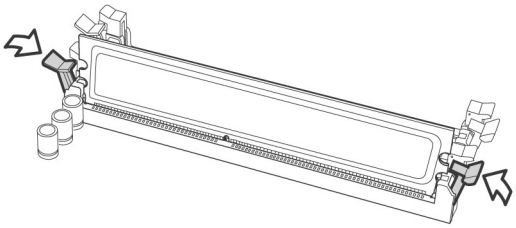
1. Press the locking levers in the direction shown in the following illustration.



2. Align the memory module with the socket. The memory module is keyed to fit only one way in the socket.



3. Seat the module firmly into the socket by gently pressing down until it sits flush with the socket. The locking levers pop up into place.



Key points to note before installing memory into Thunder h2000M:

For optimal dual-channel DDR operation, always install memory in pairs beginning with CPU1_DIMMA3 and CPU1_DIMMB3. Memory modules of the same type and density are required for dual-channel DDR operation. Mismatched memory may cause system instability.

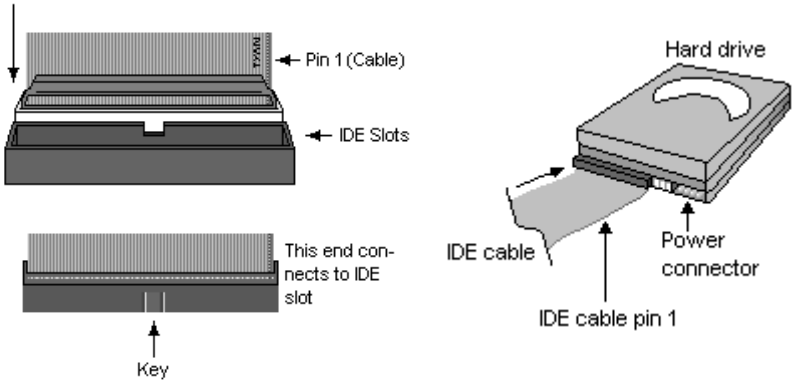
Refer to the following table for supported DDRII populations.
(Note: X indicates a populated DIMM slot)

	Single CPU Installed (CPU1 only)				Dual CPU installed (CPU1 and CPU2)			
Population Option	1	2	3	4	5	6	7	8
CPU1_DIMMA0				x				x
CPU1_DIMMB0				x				x
CPU1_DIMMA1			x	x			x	x
CPU1_DIMMB1			x	x			x	x
CPU1_DIMMA2		x	x	x		x	x	x
CPU1_DIMMB2		x	x	x		x	x	x
CPU1_DIMMA3	x	x	x	x	x	x	x	x
CPU1_DIMMB3	x	x	x	x	x	x	x	x
CPU2_DIMMA0								x
CPU2_DIMMB0								x
CPU2_DIMMA1							x	x
CPU2_DIMMB1							x	x
CPU2_DIMMA2						x	x	x
CPU2_DIMMB2						x	x	x
CPU2_DIMMA3					x	x	x	x
CPU2_DIMMB3					x	x	x	x

2.7 - Attaching Drive Cables

Attaching IDE Drive Cable
Attaching the IDE drive cable is simple. The cable is "keyed" to only allow it to be connected in the correct manner.

Attaching IDE cable to the IDE connector is illustrated below:



Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end into the drive. Each standard IDE cable has three connectors, two of which are closer together. The BLUE connector that is furthest away from the other two is the end that connects to the motherboard. The other two connectors are used to connect to drives.

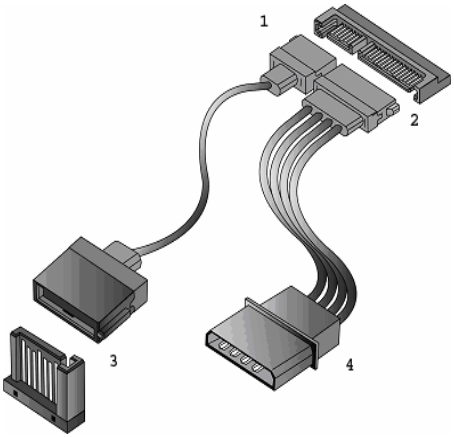
Note: Always remember to properly set the drive jumpers. If only using one device on a channel, it must be set as Master for the BIOS to detect it.

TIP: Pin 1 on the IDE cable (usually designated by a colored wire) faces the drive's power connector.

Attaching Serial ATA Cables
The Thunder h2000M is also equipped with 4 Serial ATA (SATA) channels. Connections for these drives are also very simple.

There is no need to set Master/Slave jumpers on SATA drives.

The following pictures illustrate how to connect an SATA drive



1.SATA drive cable connection

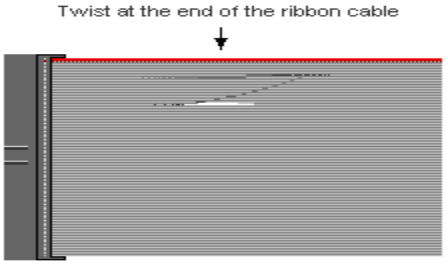
2. SATA drive power connection

3. SATA cable motherboard connector

4. SATA drive power adapter

Attaching Floppy Drive Cables

Attaching floppy diskette drives are done in a similar manner to hard drives. See the picture below for an example of a floppy cable. Most of the current floppy drives on the market require that the cable be installed with the colored stripe positioned next to the power connector. In most cases, there will be a key pin on the cable which will force a proper connection of the cable.



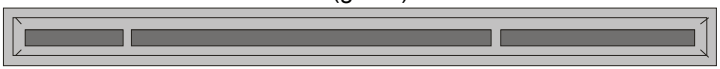
Attach first floppy drive (drive **A:**) to the end of the cable with the twist in it. Drive **B:** is usually connected to the next possible connector on the cable (the second or third connector after you install Drive **A:**).

2.8 - Installing Add-In Cards

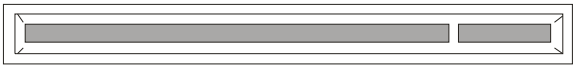
Before installing add-in cards, it's helpful to know if they are fully compatible with your motherboard. For this reason, we've provided the diagrams below, showing the most common slots that may appear on your motherboard. Not all of the slots shown will necessarily appear on your motherboard.

Two 64-bit 133/100MHz PCI-X (white) slots

One 64-bit 133/100MHz PCI-X (green) slot



One 32-bit 33MHz PCI v2.3 slot



Two PCI-Express x16 slots (each w/ x8 signal)

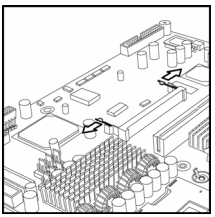
NOTE	**YOU MUST ALWAYS** unplug the power connector from the motherboard before performing system hardware changes. Otherwise you may damage the board and/or expansion device.

Simply find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards into any slots if they do not seat in place. It is better to try another slot or return the faulty card rather than damaging both the motherboard and the add-in card.

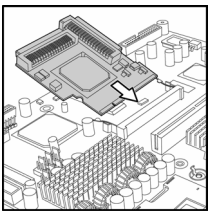
2.9 - Installing Optional SO-DIMM Modules

Your Thunder h2000M S3992-E motherboard is equipped with an optional proprietary SO-DIMM connector. The SO-DIMM connector can be used for expansion cards to provide such features as, additional SAS/SATA II or SCSI support. For details of available expansions cards, visit the TYAN website at http://www.tyan.com. To install a SO-DIMM expansion card:

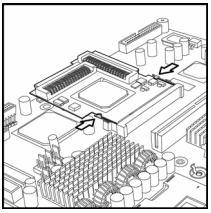
1. Open the spring levers as shown.



2. Insert the SO-DIMM card as shown, making sure that the card is the right way up. The card will fit in only one way and the screw holes in the card should line up exactly with the mounting posts on the motherboard.

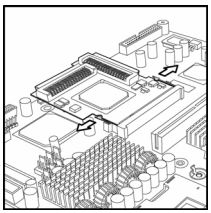


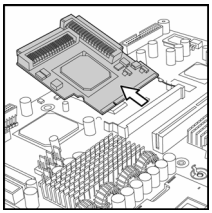
3. Push the SO-DIMM card down into place and make sure the spring levers click into place as shown.



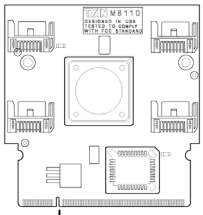
4. Screw the board into place using one or two screws as required.

Removal of a SO-DIMM card is a reversal of the installation procedure. Push out the spring levers as shown and pull the card out of the socket.



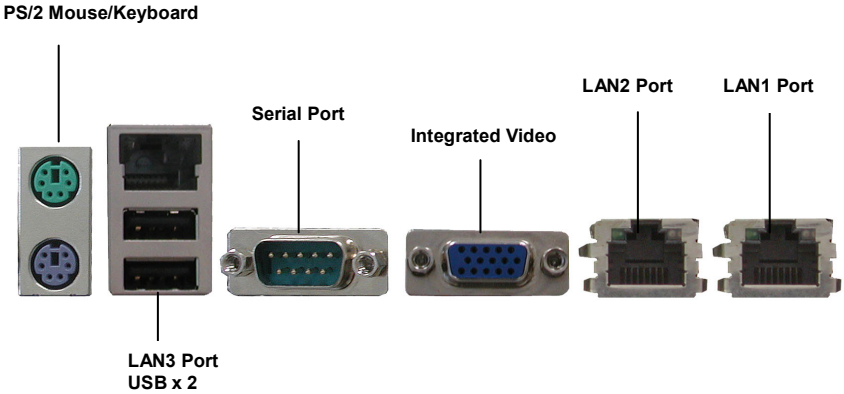


The SO-DIMM expansion cards will fit in the slot only one way. Make sure that you align the slot in the card with the key in the card slot.



2.10 - Connecting External Devices

Your motherboard supports a number of different interfaces for connecting peripherals. Some I/O ports may not be available with the board due to the different configurations.



Peripheral devices can be plugged straight into any of these ports but software may be required to complete the installation.

LAN1 and LAN2 LED Color Definition
The two onboard LAN ports have green LEDs to indicate the LAN status. The chart below illustrates the different LED states.

LAN1 and LAN2 Link/Activiey LED Scheme	
Left LED	**Right LED**
Activity	Link
Green (Blink)	Green

LAN3 LED Color Definition
The onboard Ethernet port has green and yellow LEDs to indicate LAN status. The chart below illustrates the different LED states.

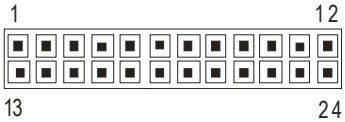
	10/100 Mbps LAN3 Link/Activity LED Scheme		
	Speed	**Left LED**	**Right LED**
	Link 10Mbps	Green	Off
	Activity 10Mbps	Green (Blink)	Off
	Link 100Mbps	Green	Green
	Activity 100Mbps	Green (Blink)	Green

2.11- Installing the Power Supply

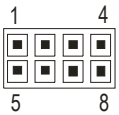
There are two power connectors on your Thunder h2000M.
The Thunder h2000M requires an EPS12V (24 pin + 8 pin) power supply to boot.

Please be aware that ATX 2.x and ATXGES power supplies are **not compatible** with the board and can damage the motherboard and/or CPU(s).

EPS12V Main Power 24-Pin
(Chipsets & Components)



12	+3.3V	24	GND
11	+12V2	23	+5V
10	+12V2	22	+5V
9	+5VSB	21	+5V
8	PWR OK	20	RESVD
7	GND	19	GND
6	+5V	18	GND
5	GND	17	GND
4	+5V	16	PSON#
3	GND	15	GND
2	+3.3V	14	-12V
1	+3.3V	13	+3.3V



EPS 12V 8-pin (CPU Power)

4	GND	8	+12V3
3	GND	7	+12V3
2	GND	6	+12V3
1	GND	5	+12V3

Applying power to the board

1. Connect the EPS 12V 8-pin power connector.
2. Connect the EPS 12V 24-pin power connector.
3. Connect power cable to power supply and power outlet

NOTE	**YOU MUST** unplug the power supply from the wall outlet before plugging the power cables to motherboard connectors.

2.12 – Finishing Up

Congratulations! You're finished setting up the hardware aspect of your computer. Before closing up your chassis, make sure that all cables and wires are connected properly, especially IDE cables and jumpers. You may have difficulty powering on your system if the motherboard jumpers are not set correctly.

In the rare circumstance that you have experienced difficulty, you can find help by asking your vendor for assistance. If they are not available for assistance, please find setup information and documentation online at our website or by **calling your vendor's support line.**

NOTE

Chapter 3: BIOS

3.1 – BIOS Setup Utility

With the BIOS setup utility, you can modify BIOS settings and control the special features of your computer. The setup utility uses a number of menus for making changes and turning the special features on or off.

NOTE	All menus are based on a typical system. The actual menus displayed on your screen may be different and depend on the hardware and features installed in your computer.

To start the BIOS setup utility:

a. Turn on or reboot your system
b. Press <Del> during POST (F4 on remote console) to start BIOS setup utility

BIOS Setup Utility

Main Advanced PCI/PnP Boot Security Chipset Exit

System Overview

AMIBIOS
Version : 08.00.xx
Build Date : 08/31/05
ID : 0AAAA000

Processor
Type : AMD Opteron(tm) Model xxx
Speed : xxxx MHz
Count : x

System Memory
Size : xxxx MB

System Time [22:21:21]
System Date [Tue 01/01/2002]

Use [ENTER], [TAB] or [SHIFT-TAB] to select a field

Use [+] or [-] to configure system time.

←→ Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

To select an item
Use the left/right (← →) arrow keys to make a selection.

To display a sub-menu (A pointer " ▸ " marks all sub menus)
Use the arrow keys to move the cursor to the sub menu you want. Then press <Enter>.

3.2 – BIOS Menu Bar

The menu bar at the top of the windows lists these selections:

Main	To configure basic system setups
Advanced	To configure the advanced chipset features
PCI/PnP	To configure legacy Plug & Play or PCI settings
Boot	To configure system boot order
Security	To configure user and supervisor passwords
Chipset	To configure chipset management features
Exit	To exit setup utility

NOTE Options written in **bold type** represent the BIOS setup default

3.3 – BIOS Legend Bar

The chart describes the legend keys and their alternates:

Key	Function
<F1>	General help window
<ESC>	Exit current menu
← → arrow keys	Select a different menu
↑ or ↓ arrow keys	Move cursor up/down
<Tab> or <Shift-Tab>	Cycle cursor up/down
<Home> or <End>	Move cursor to top/bottom of the window
<PgUp> or <PgDn>	Move cursor to next/previous page
<->	Select the previous value/setting of the field
<+>	Select the next value/setting of the field
<F8>	Load Fail Safe default configuration values of the menu
<F9>	Load the Optimal default configuration values of the menu
<F10>	Save and exit
<Enter>	Execute command or select submenu

Getting Help

Pressing [**F1**] will display a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press [**ESC**] or the [**F1**] key again.

In Case of Problems

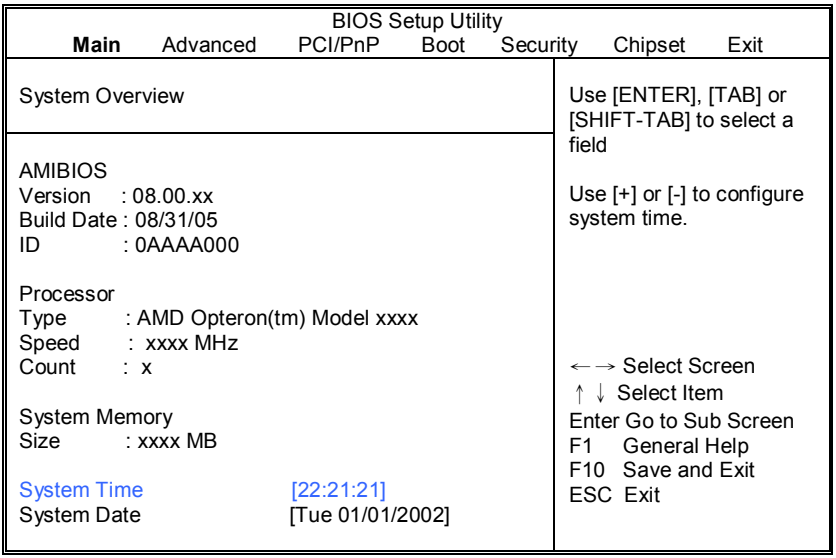
If you discover that you have trouble booting the computer after making and saving the changes with the BIOS setup program, you can restart the computer by holding the power button down until the computer shuts off (usually within 4 seconds); resetting by pressing CTRL-ALT-DEL; or clearing the CMOS.

The best advice is to only alter settings that you thoroughly understand. In particular, do not change settings in the Chipset section unless you are absolutely sure of the outcome. The Chipset defaults were carefully chosen by TYAN or your system manufacturer for the best performance and reliability. Even a seemingly small change to the Chipset setup options may cause the system to become unstable or unusable.

3.4 – BIOS Main Menu

The Main BIOS Menu is the first screen that you can navigate. The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured, options in blue can be changed.

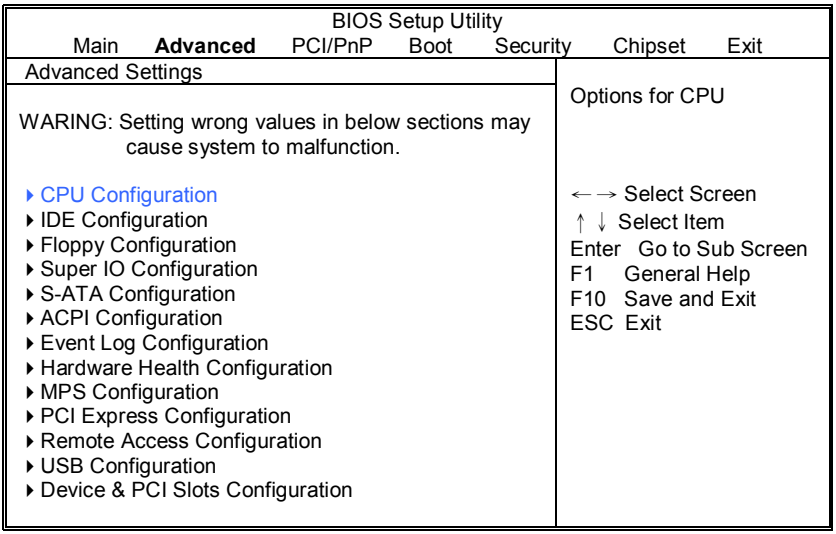
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often, a text message will accompany it.



Feature	Option	Description
Main		
System Time	HH : MM : SS	Set the system time
System Date	MM : DD : YYYY	Set the system date

3.5 – BIOS Advanced Menu

You can select any of the items in the left frame of the screen, such as Super I/O Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

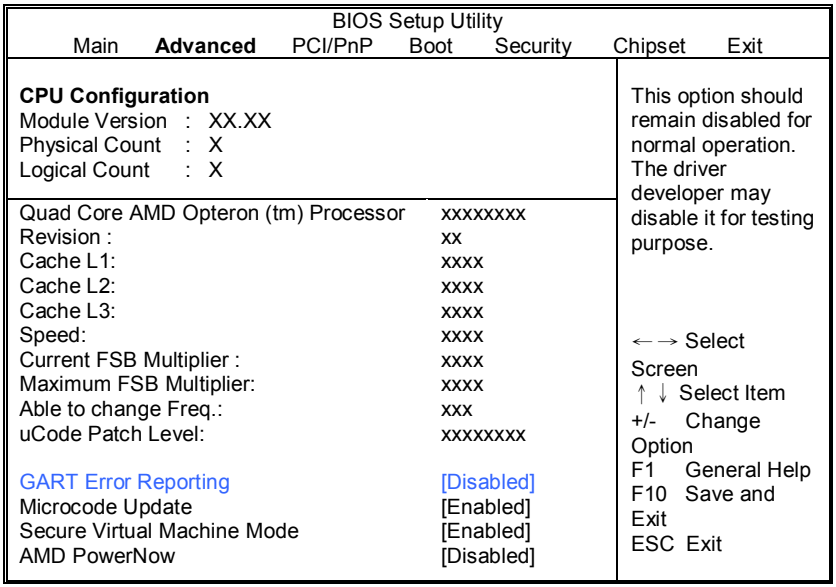


Feature	Option	Description
Advanced Settings		
CPU Configuration	**Menu Item**	Options for CPU
IDE Configuration	**Menu Item**	Configure the IDE device(s)
Floppy Configuration	**Menu Item**	Configure the Floppy drive(s)
Super IO Configuration	**Menu Item**	Configures Super IO Chipset SCH4307
S-ATA Configuration	**Menu Item**	Configure ServerWorks HT1000 S-ATA
ACPI Configuration	**Menu Item**	Section for Advanced ACPI Configuration
Event Log Configuration	**Menu Item**	Mark as read, Clear or View Event Log statistics
Hardware Health Configuration	**Menu Item**	Configure/monitor the Hardware Health

Feature	Option	Description
Advanced Settings		
MPS Configuration	**Menu Item**	Configure the Multi-Processor Table
PCI Express Configuration	**Menu Item**	Configure PCI Express L0 and L1 link power states.
Remote Access Configuration	**Menu Item**	Configure Remote Access
USB Configuration	**Menu Item**	Configure the USB support
Device & PCI Slots Configuration	**Menu Item**	Onboard Devices and PCI Add-On Cards Enabled/Disabled

3.5.1 CPU Configuration Sub-Menu

You can use this screen to view CPU Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
CPU Configuration
Module Version : XX.XX
Physical Count : X
Logical Count : X
Quad Core AMD Opteron (tm) Processor xxxxxxxx
Revision : xx
Cache L1: xxxx
Cache L2: xxxx
Cache L3: xxxx
Speed: xxxx
Current FSB Multiplier : xxxx
Maximum FSB Multiplier: xxxx
Able to change Freq.: xxx
uCode Patch Level: xxxxxxxx
GART Error Reporting [Disabled]
Microcode Update [Enabled]
Secure Virtual Machine Mode [Enabled]
AMD PowerNow [Disabled]
This option should remain disabled for normal operation. The driver developer may disable it for testing purpose.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
CPU Configuration		
Module Version	Read only	Displays information about CPU
Physical Count		
Logical Count		
Revision	Read only	Displays information about CPU
Cache L1		
Cache L2		
Cache L3		
Speed		
Current FSB Multiplier		
Maximum FSB Multiplier		
Able to change Freq.		
uCode Patch Level		

Feature	Option	Description
CPU Configuration		
GART Error Reporting	**Disabled**	This option should remain disabled for normal operation. The driver developer may enable it for the purpose of testing.
	Enabled	
Microcode Update	**Enabled**	Enable CPU Microcode Update
	Disabled	
Secure Virtual Machine Mode	**Enabled**	Enable/Disable Secure Virtual Machine Mode (SVM)
	Disabled	
AMD PowerNow	**Disabled**	Enable/disable the generation of ACPI_PPC, _PSS, and _PCT objects.
	Enabled	

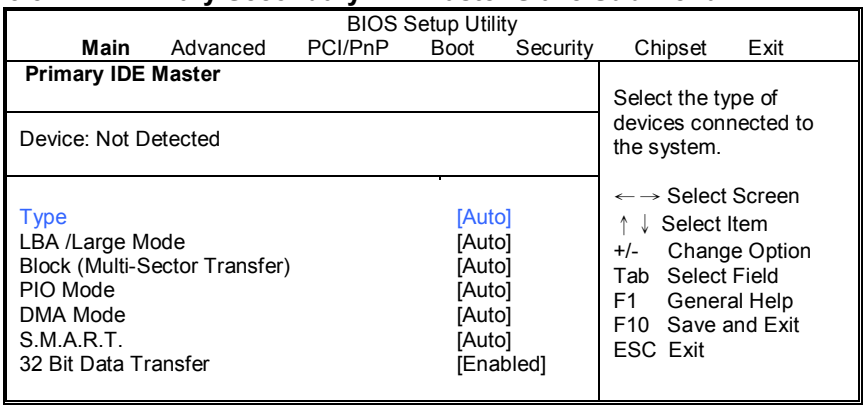
3.5.2– IDE Configuration Sub-Menu

You can use this screen to select options for the IDE Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

BIOS Setup Utility Main **Advanced** PCI/PnP Boot Security Chipset Exit	
IDE Configuration	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices. ←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit
▸ Primary IDE Master [xxxx] ▸ Primary IDE Slave [xxxx] IDE Detect Time Out (Sec) : [xx]	

Feature	Option	Description
IDE Configuration		
Primary IDE Master/Slave	**Auto** XXXX Not Detected Enabled	While entering setup, BIOS auto detects the presence of IDE devices. This displays the status of auto detection of IDE devices.
IDE Detect Time Out (Sec)	**0~35** (at 5 interval)	Selects the time out value for detecting ATA/ATAPI device(s).

3.5.2.1 – Primary/Secondary IDE Master/Slave Sub-Menu



Feature	Option	Description
Primary IDE Master		
Type	**Auto** Not Installed CD/DVD ARMD	Select the type of device connected to the system.
LBA/Large Mode	**Auto** Disabled	Auto: Enabled LBA Mode if the device supports it and the device is not already formatted with LBA Mode disabled. Disabled: Disabled LBA Mode.
Block (Multi-Sector Transfer)	**Auto** Disabled	Disabled: The Data transfer from and to the device occurs one sector at a time. Auto: The Data transfer from and to the device occurs multiple sectors at a time if the device supports it.
PIO Mode	**Auto** 0~4 (at 1 interval)	Select the PIO Mode. Select Auto to enhance hard disk performance by optimizing the hard disk timing.
DMA Mode	**Auto**	Select DMA Mode. Auto: Auto detected.
S.M.A.R.T.	**Auto** Disabled Enabled	S.M.A.R.T (Self-Monitoring Analysis and Reporting Technology) is a utility that monitors your disk status to predict hard disk failure.
32Bit Data Transfer	**Enabled** Disabled	Enable 32-bit to maximize the IDE hard disk data transfer rate.

3.5.3 – Floppy Configuration Sub-Menu

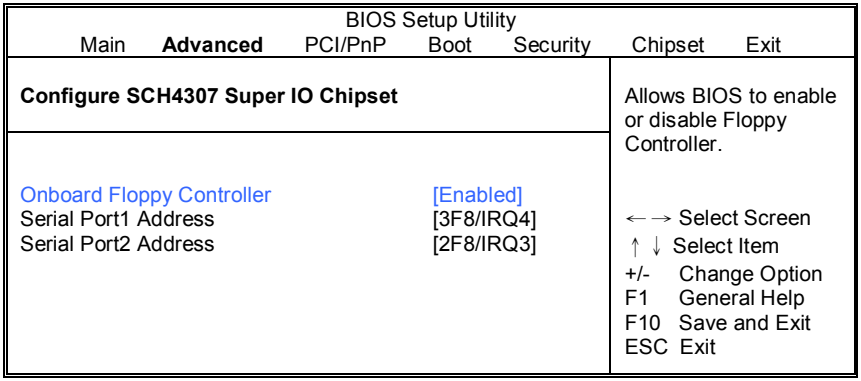
You can use this screen to specify options for the Floppy Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages.

BIOS Setup Utility Main **Advanced** PCI/PnP Boot Security Chipset Exit	
Floppy Configuration	Select the type of floppy drive connected to the system.
Floppy A [1.44 MB 31/2"] Floppy B [Disabled]	←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Floppy Configuration		
Floppy A Floppy B	Disabled 360 KB 51/4" 1.2 MB 51/4" 720 KB 31/2" **1.44 MB 31/2"** 2.88 MB 31/2"	Selects the type of floppy drive connected to the system.

3.5.4 – Super IO Configuration Sub-Menu

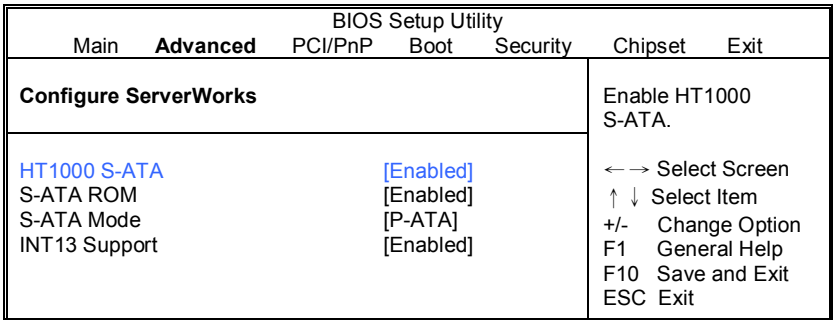
You can use this screen to select options for the Super I/O settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Configure SCH4307 Super IO Chipset
Allows BIOS to enable or disable Floppy Controller.
Onboard Floppy Controller [Enabled]
Serial Port1 Address [3F8/IRQ4]
Serial Port2 Address [2F8/IRQ3]
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Configure SCH4307 Super IO Chipset		
Onboard Floppy Controller	**Enabled**	Allows BIOS to enable or disable the floppy controller.
	Disabled	
Serial Port1 Address	**3F8/IRQ4**	Allows BIOS to select Serial Port1 Base Addresses.
	3E8/IRQ4	
	2E8/IRQ3	
	Disabled	
Serial Port2 Address	**2F8/IRQ3**	Allows BIOS to select Serial Part2 Base Addresses.
	3E8/IRQ4	
	2E8/IRQ3	
	Disabled	

3.5.5 S-ATA Configuration Sub-Menu

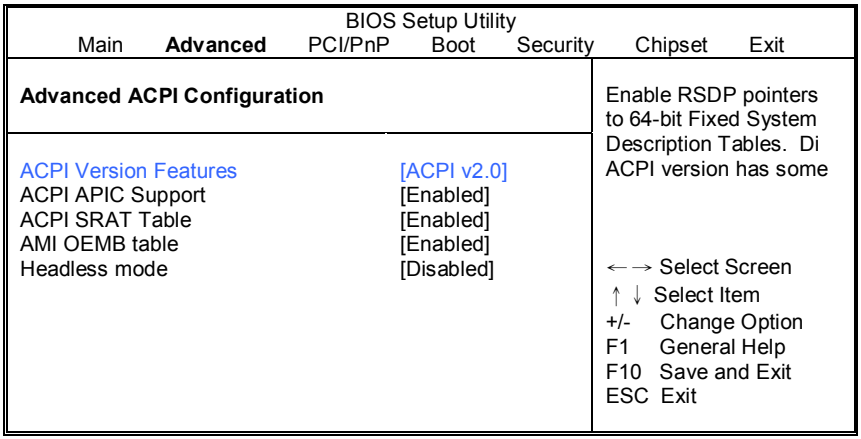
You can use this screen to view S-ATA Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



Feature	Option	Description
Configure ServerWorks		
HT1000 S-ATA	**Enabled** Disabled	Allows user to enable or disable HT1000 S-ATA controller.
S-ATA ROM	**Enabled** Disabled	Enable or disable SATA ROM. To support SATA DVD/CDROM boot function, please disable SATA ROM.
S-ATA Mode	**P-ATA** S-ATA S-ATA RAID	Sets S-ATA mode as P-ATA emulation native S-ATA, or S-ATA RAID.
INT13 Support	**Enabled** Disabled	Enables or disables INT13 support

3.5.6 –ACPI Configuration Sub-Menu

Use this screen to select options for ACPI. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on this page. The screen is shown below.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Advanced ACPI Configuration
ACPI Version Features [ACPI v2.0]
ACPI APIC Support [Enabled]
ACPI SRAT Table [Enabled]
AMI OEMB table [Enabled]
Headless mode [Disabled]
Enable RSDP pointers to 64-bit Fixed System Description Tables. Di ACPI version has some
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Advanced ACPI Configuration		
ACPI Version Features	ACPI v3.0 **ACPI v2.0** ACPI v1.0	Set this value to allow or prevent the system to be complaint with the ACPI 2.0 specification.
ACPI APIC Support	**Enabled** Disabled	This option allows you to define whether or not to enable APIC features.
ACPI SRAT Table	**Enabled** Disabled	Enable or disable the building of ACPI SRAT Table.
AMI OEMB table	**Enabled** Disabled	Set this value to allow the ACPI BIOS to add a pointer to an OEMB table in the Root System Description Table (RSDT) table. Note: OEMB table is used to pass POST data to the AMI code during ACPI O/S operations.
Headless mode	Enabled **Disabled**	Enable or disable Headless operation mode through ACPI.

3.5.7 – Event Logging details Sub-Menu

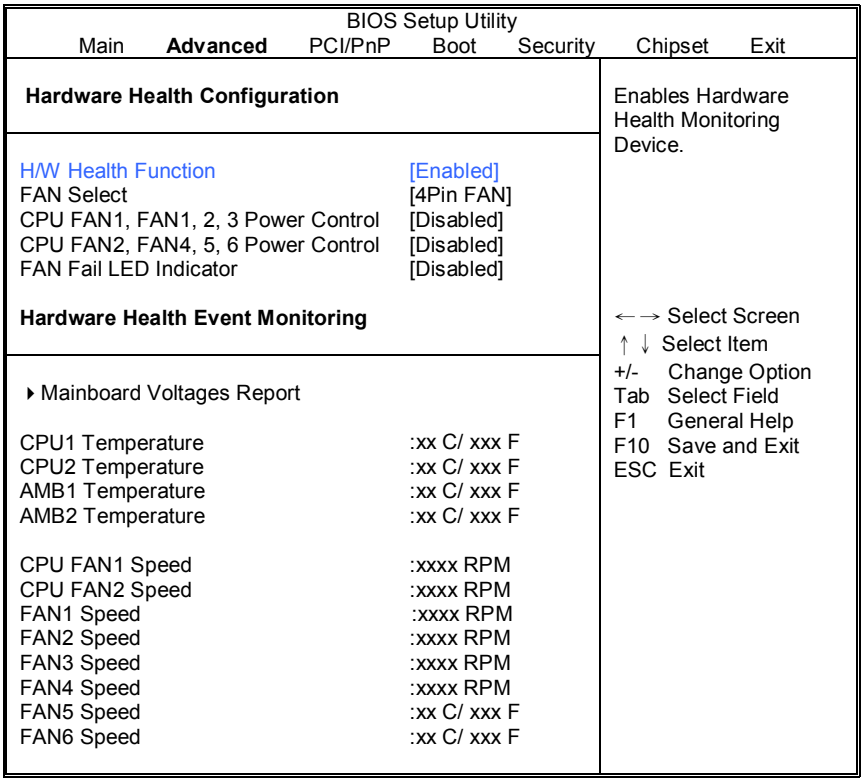
You can use this screen to view the Event Log Control Menu. This logs system events (such as CMOS clear, ECC memory errors, etc) and writes the log into NVRAM. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

BIOS Setup Utility Main **Advanced** PCI/PnP Boot Security Chipset Exit	
Event Logging details	View all unread events on the Event Log.
View Event Log Mark All Events as Read Clear Event Log Event Log Statistics	←→ Select Screen ↑ ↓ Select Item +/- Change Option Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
Event Logging details		
View Event Log		Views all unread events on the Event Log.
Mark All Events as Read	OK Cancel	Marks all unread events as read.
Clear Event Log	OK Cancel	Erases all of events.
Event Log Statistics		View details on the count of total unread events. Other stats include size occupied and size free. (in terms of event units)

3.5.8 – Hardware Health Configuration Sub-Menu

You can use this screen to view the Hardware Health Configuration Settings. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Hardware Health Configuration
H/W Health Function [Enabled]
FAN Select [4Pin FAN]
CPU FAN1, FAN1, 2, 3 Power Control [Disabled]
CPU FAN2, FAN4, 5, 6 Power Control [Disabled]
FAN Fail LED Indicator [Disabled]
Hardware Health Event Monitoring
Mainboard Voltages Report
CPU1 Temperature :xx C/ xxx F
CPU2 Temperature :xx C/ xxx F
AMB1 Temperature :xx C/ xxx F
AMB2 Temperature :xx C/ xxx F
CPU FAN1 Speed :xxxx RPM
CPU FAN2 Speed :xxxx RPM
FAN1 Speed :xxxx RPM
FAN2 Speed :xxxx RPM
FAN3 Speed :xxxx RPM
FAN4 Speed :xxxx RPM
FAN5 Speed :xx C/ xxx F
FAN6 Speed :xx C/ xxx F
Enables Hardware Health Monitoring Device.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Hardware Health Configuration		
H/W Health Function	**Enabled**	Enables Hardware Health Monitoring Device.
	Disabled	
FAN Select	**4Pin FAN**	Selects the FAN type.
	3Pin FAN	

Feature	Option	Description
Hardware Health Configuration		
CPU FAN1, FAN1, 2, 3 Power Control	Enabled	FAN power duty cycle is auto dynamic programmed in selected temperature range. Disabled: Fan Power On. Enabled: Fan Power Duty Cycle=30%(40°C)-100%(60°C), see CPU temperature
	Disabled	
CPU FAN2, FAN4, 5, 6 Power Control	Enabled	FAN power duty cycle is auto dynamic programmed in selected temperature range. Disabled: Fan Power On. Enabled: Fan Power Duty Cycle=30%(40°C)-100%(60°C), see mainboard temp.
	Disabled	
FAN Fail LED Indicator	Enabled	Enabled: Any FAN speed less than 800 RPM, the FAN Fail LED will be lighted.
	Disabled	

Feature	Option	Description
Hardware Health Event Monitoring		
Mainboard Voltages Report	Read only	Displays Voltage for CPU, memory, & other devices.
CPU1 Temperature	Read only	Displays CPU Temperature and FAN Speed.
CPU2 Temperature		
AMB1 Temperature		
AMB2 Temperature		
CPU FAN1 Speed CPU FAN2 Speed		
FAN1/2/3/4/5/6 Speed		

3.5.8.1 – Mainboard Voltages Report Sub-Menu

BIOS Setup Utility

Main **Advanced** PCI/PnP Boot Security Chipset Exit

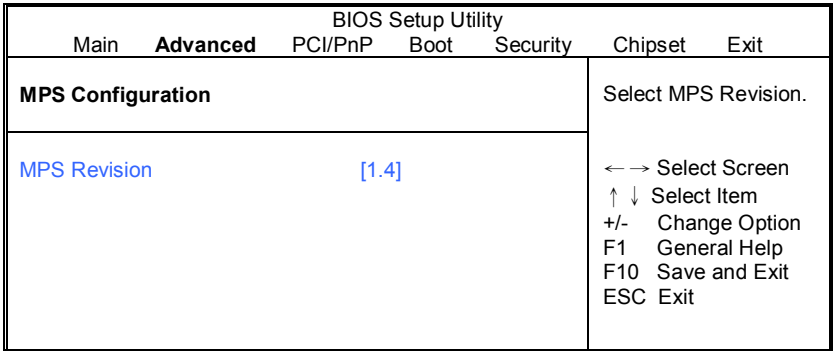
Board Voltages Report

CPU1 Vdimm	: x.xxx V
CPU2 Vdimm	: x.xxx V
CPU1 Vcore	: x.xxx V
CPU2 Vcore	: x.xxx V
+V3.3 (SB)	: x.xxx V
+3VDU	: x.xxx V
+V5 (SB)	: x.xxx V
VCC	: x.xxx V
+12V (for cpu1 vcore)	: x.xxx V
+12V (for cpu2 vcore)	: x.xxx V

← → Select Screen
↑ ↓ Select Item
+/- Change Option
Tab Select Field
F1 General Help
F10 Save and Exit
ESC Exit

3.5.9 MPS Configuration Sub-Menu

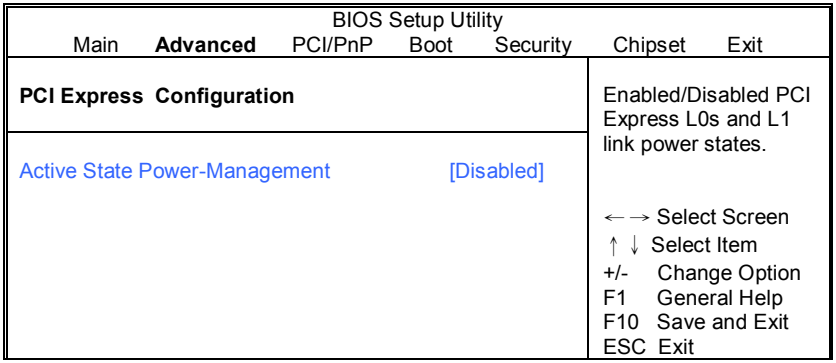
You can use this screen to select MPS revision. Use the up and down arrow (↑/↓) keys to select an item. The settings are described on the following pages.



Feature	Option	Description
MPS Configuration		
MPS Revision	1.1 **1.4**	Allows user to select MPS revision.

3.5.10 PCI Express Configuration Sub-Menu

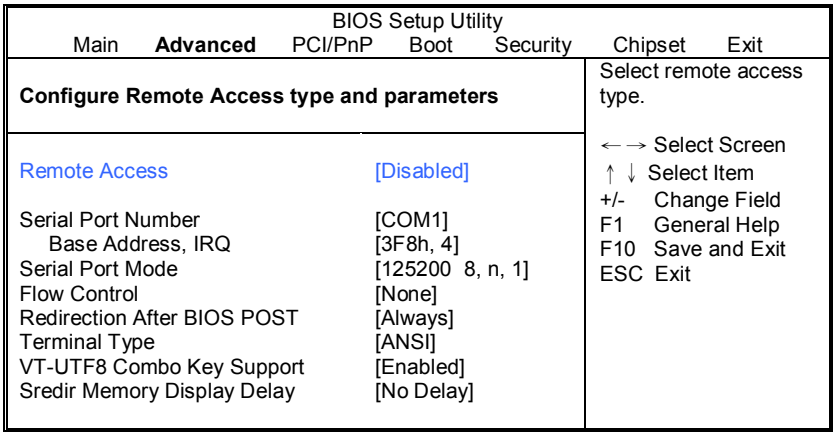
You can use this screen to enable PCI Express support. Use the up and down arrow (↑/↓) keys to select an item. The settings are described on the following pages.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
PCI Express Configuration
Active State Power-Management [Disabled]
Enabled/Disabled PCI Express L0s and L1 link power states.
←→ Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
PCI Express Configuration		
Active State Power-Management	Enabled	Enabled/Disabled PCI Express L0s and L1 link power states.
	Disabled	

3.5.11 – Remote Access Configuration Sub-Menu

You can use this screen to view the Remote Access Configuration Menu. This feature allows access to the Server remotely via serial port. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

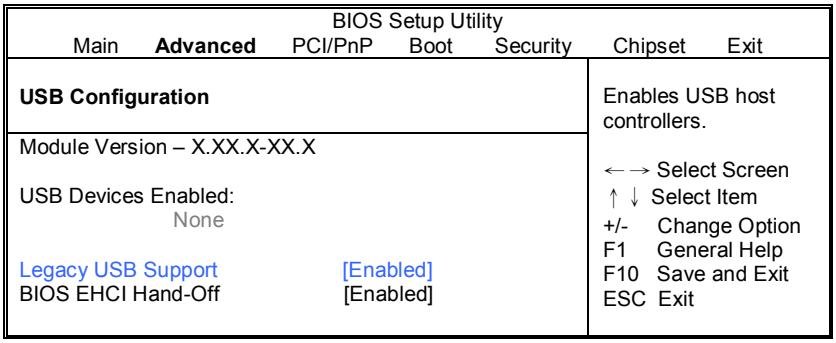

BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Configure Remote Access type and parameters
Remote Access [Disabled]
Serial Port Number [COM1]
Base Address, IRQ [3F8h, 4]
Serial Port Mode [125200 8, n, 1]
Flow Control [None]
Redirection After BIOS POST [Always]
Terminal Type [ANSI]
VT-UTF8 Combo Key Support [Enabled]
Sredir Memory Display Delay [No Delay]
Select remote access type.
← → Select Screen
↑ ↓ Select Item
+/- Change Field
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Configure Remote Access type and parameters		
Remote Access	Enabled	Enables remote access to system through serial port.
	Disabled	
Serial Port Number	**COM1**	Select Serial Port for console redirection. Make sure the selected port is enabled.
	COM2	
Base Address, IRQ	Read only	
Serial Port Mode	**115200 8,n,1**	Select Serial Port settings.
	57600 8,n,1	
	19200 8,n,1	
	9600 8,n,1	
Flow Control	**None**	Select Flow Control for console redirection.
	Hardware	
	Software	

Feature	Option	Description
Configure Remote Access type and parameters		
Redirection After BIOS POST	**Disabled**	Disable: Turns off the redirection after POST Boot Loader: Redirection is active during POST and during Boot Loader. Always: Redirection is always active. <Some OSs may not work if set to Always>
	Boot Loader	
	Always	
Terminal Type	**ANSI**	Select the target terminal type.
	VT100	
	VT-UTF8	
VT-UTF8 Combo Key Support	**Enabled**	Enable VT-UTF8 Combination key Support for ANSI/VT100 terminals.
	Disabled	
Sredir Memory Display Delay	**No Delay**	Gives the delay in seconds to display memory information
	Delay 1 Sec	
	Delay 2 Sec	
	Delay 4 Sec	

3.5.12 – USB Configuration Sub-Menu

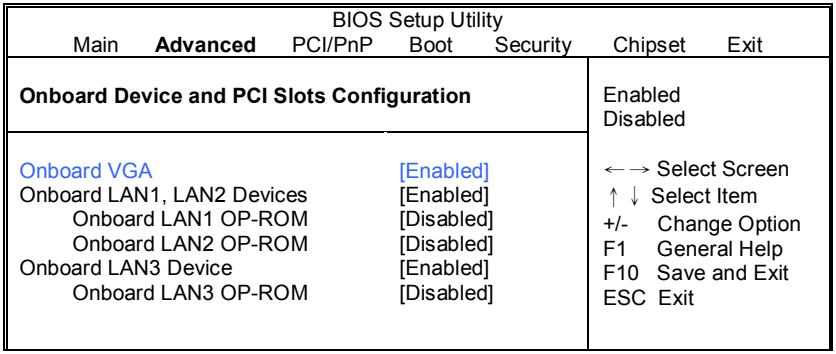
You can use this screen to view the USB Configuration Menu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.



Feature	Option	Description
USB Configuration		
Legacy USB Support	Disabled	Enables support for legacy USB.
	Enabled	
BIOS EHCI Hand-Off	**Enabled**	This is a work around for OSes without EHCI hand-off support. The EHCI ownership change should claim by EHCI driver.
	Disabled	

3.5.13 Device & PCI Slots Configuration Sub-Menu

You can use this screen to enable the onboard devices and PCI slots. Use the up and down arrow (↑/↓) keys to select an item. The settings are described on the following pages.



Feature	Option	Description
MPS Configuration		
Onboard VGA	Disabled **Enabled**	Enabled/Disabled VGA controller
Onboard LAN1, LAN2 Devices Onboard LAN3 Device	Disabled **Enabled**	Enabled/Disabled LAN controller
Onboard LAN1 OP-ROM Onboard LAN2 OP-ROM Onboard LAN3 OP-ROM	**Disabled** Enabled	Executed LAN OPROM or not

3.6 –BIOS PCI/PnP Menu

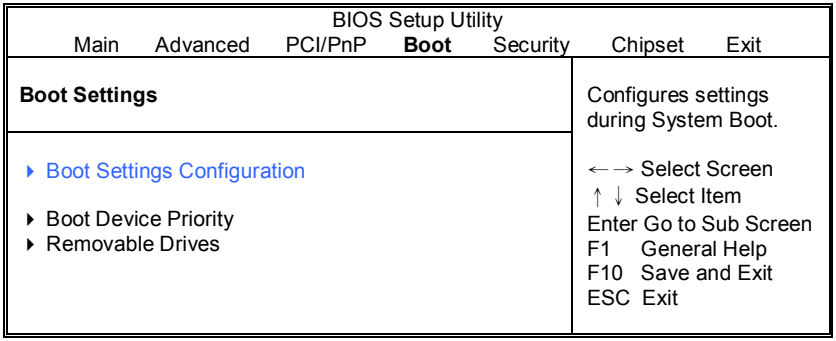
You can use this screen to view PnP (Plug & Play) BIOS Configuration Menu. This menu allows the user to configure how the BIOS assigns resources & resolves conflicts. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option. The settings are described on the following pages.

BIOS Setup Utility Main Advanced **PCI/PnP** Boot Security Chipset Exit	
Advanced PCI/PnP Settings	Clear NVRAM during System Boot.
WARING: Setting wrong values in below sections may cause system to malfunction.	←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit
Clear NVRAM [No] Plug & Play O/S [Yes] PCI Latency Timer [64] PCI Bus Scan Order [Descent] Allocate IRQ to PCI VGA [Yes] Palette Snooping [Disabled] PCI IDE BusMaster [Disabled]	

Feature	Option	Description
Advanced PCI/PnP Settings		
Clear NVRAM	**No**	Clears NVRAM during system Boot.
	Yes	
Plug & Play OS	**Yes**	No: lets the BIOS configure all the devices in the system. Yes: lets the operating system configure Plug and Play (PnP) devices not required for boot if your system has a Plug and Play operating system.
	No	
PCI Latency Timer	32	This setting controls how many PCI clocks each PCI device can hold the bus before another PCI device takes over. When set to higher values, every PCI device can conduct transactions for a longer time and thus improve the effective PCI bandwidth. Values in units of PCI clocks for PCI device latency timer register.
	64	
	96	
	128	
	160	
	192	
	224	
	248	
PCI Bus Scen Order	Ascent	Ascent: Scan PCI bus from bus 0 to maximum. Descent: Scan PCI bus from maximum to bus 0.
	Descent	
Allocate IRQ to PCI VGA	**Yes**	Yes: assigns IRQ to PCI VGA card if card requests IRQ.
	No	
Palette Snooping	**Disabled**	This is the default setting and should not be changed unless the VGA card manufacturer requires Palette Snooping to be Enabled. Enabled: informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly.
	Enabled	
PCI IDE BusMaster	**Disabled**	Enabled: BIOS uses PCI bus mastering for reading / writing to IDE drives.
	Enabled	
	Reserved	

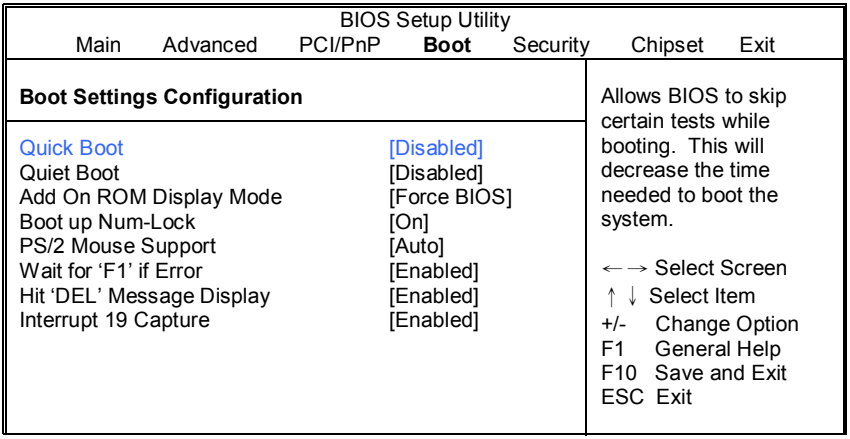
3.7 – BIOS Boot Menu

You can display Boot Setup option by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.



3.7.1 – Boot Settings Configuration Sub-Menu

Use this screen to select options for the Boot Settings Configuration. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Boot Settings Configuration
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
Quick Boot [Disabled]
Quiet Boot [Disabled]
Add On ROM Display Mode [Force BIOS]
Boot up Num-Lock [On]
PS/2 Mouse Support [Auto]
Wait for 'F1' if Error [Enabled]
Hit 'DEL' Message Display [Enabled]
Interrupt 19 Capture [Enabled]
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Boot Settings Configuration		
Quick Boot	Enabled **Disabled**	This option allows user bypass BIOS self test during POST.
Quiet Boot	**Disabled** Enabled	Disabled: displays normal POST messages. Enabled: displays OEM log instead of POST messages.
Add On ROM Display Mode	**Force BIOS** Keep Current	Allows user to force BIOS/Option ROM of add-on cards to be displayed during quiet boot.
Boot up Num-Lock	**On** Off	Selects Power-on state for Numlock.
PS/2 Mouse Support	Enabled Disabled **Auto**	Selects support for PS/2 Mouse.
Wait for 'F1' If Error	**Enabled** Disabled	Waits for F1 key to be present if error occurs.
Hit 'DEL' Message Display	**Enabled** Disabled	Displays "Press DEL to run Setup" in POST.
Interrupt 19 Capture	Disabled **Enabled**	Enabled: allows option ROMs to trap interrupt 19.

3.7.2 – Boot Device Priority Sub-Menu

Use this screen to select options for the Boot Device Priority. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

BIOS Setup Utility

Main Advanced PCI/PnP **Boot** Security Chipset Exit

Boot Device Priority

1st Boot Device [xx,xxx-xxxxx:xxx]
2nd Boot Device [xx,xxx-xxxxx:xxx]

Specifies the boot sequence from the available devices.

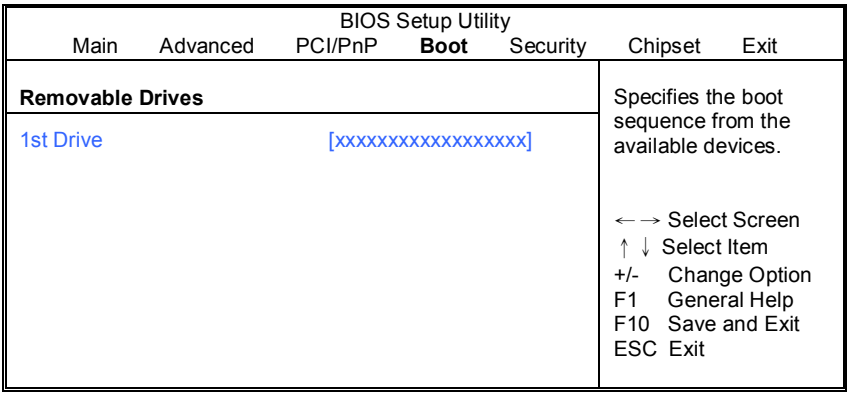
A device enclosed in parenthesis has been disabled in the corresponding type menu.

←→ Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Boot Device Priority		
1st Boot Device 2nd Boot Device	**xx,xxx-xxxxx:xxx** xx,xxx-xxxxx:xxx Disabled	Settings for boot priority. These can be customized depending on your preference.

3.7.3 – Removable Drives Sub-Menu

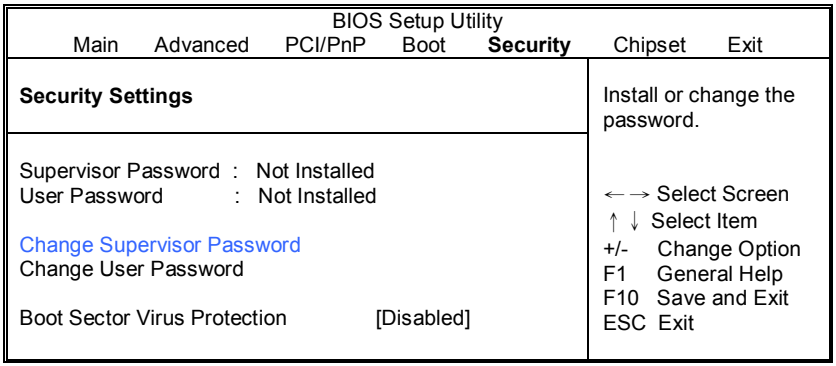
Use this screen to select options for the Removable Drives. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.



Feature	Option	Description
Removable Drives		
1st Drive	**xx,xxx-xxxxx:xxx** Disabled	Specifies the boot sequence for removable drive booting. This option will show all removable devices.

3.8 – BIOS Security Menu

The system can be configured so that all users must enter a password every time the system boots or when BIOS Setup is entered, using either the Supervisor password or User password. The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must clear CMOS and reconfigure.



Feature	Option	Description
Security Settings		
Supervisor Password:	**Not Installed** Installed	If the password has been set, Installed displays. If no password is set, Not Installed displays.
User Password:	**Not Installed** Installed	If the password has been set, Installed displays. If no password is set, Not Installed displays.
Change Supervisor Password		Selects this option to change or install Supervisor Password.
Change User Password		Selects this option to change or install User Password.
Boot Sector Virus Protection	**Disabled** Enabled	When it is set to [Enabled], BIOS will issue a virus warning message and beep if a write to the boot sector or the partition table of the HDD is attempted.

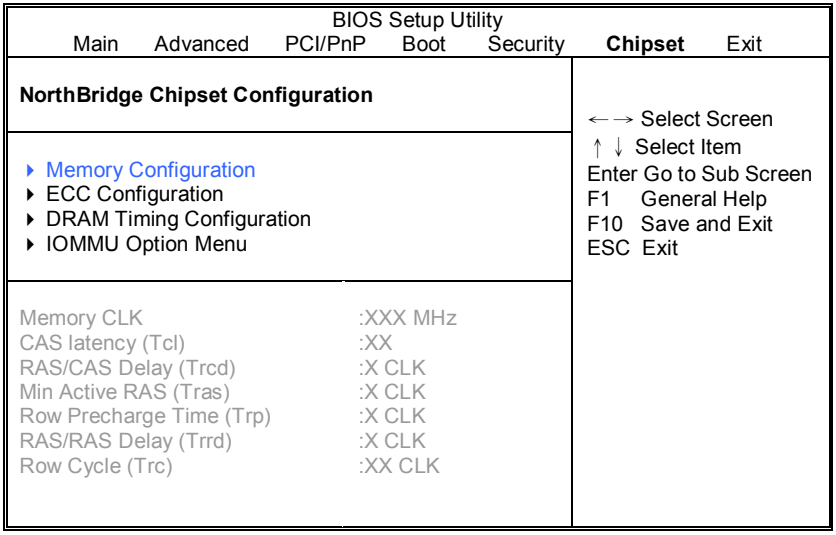
3.9 – BIOS Chipset Menu

This menu allows the user to customize functions of the AMD Chipsets. North Bridge configuration contains options for Memory & CPU settings. South Bridge configuration contains options for SM Bus & USB. Additional configuration for the AMD8131 PCI-X Tunnel is available in the PCI-X Configuration Menu. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

BIOS Setup Utility						
Main	Advanced	PCI/PnP	Boot	Security	**Chipset**	Exit
▸ NorthBridge Configuration ▸ HT2000 System I/O Configuration ▸ HT1000 South Bridge Configuration					Options for NB. ←→ Select Screen ↑ ↓ Select Item +/- Change Option Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit	

3.9.1 – North Bridge Chipset Configuration Sub-Menu

This menu gives options for customizing memory & Hypertransport settings. Select a menu by highlighting it using the Arrow (↑/↓) keys and pressing Enter. The settings are described on the following pages.

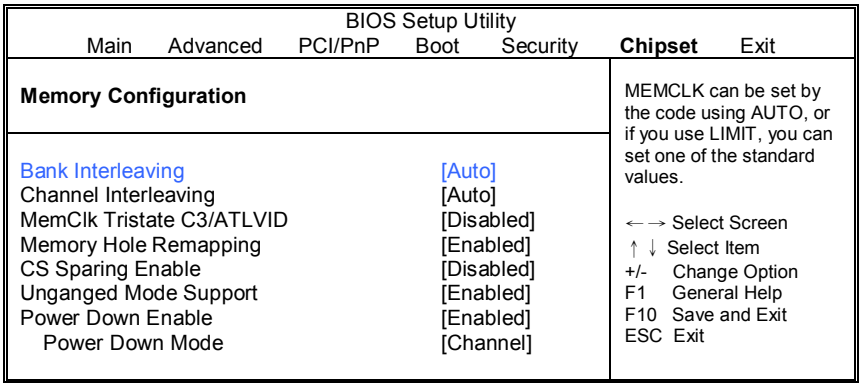

BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
NorthBridge Chipset Configuration
Memory Configuration
ECC Configuration
DRAM Timing Configuration
IOMMU Option Menu
Memory CLK :XXX MHz
CAS latency (Tcl) :XX
RAS/CAS Delay (Trcd) :X CLK
Min Active RAS (Tras) :X CLK
Row Precharge Time (Trp) :X CLK
RAS/RAS Delay (Trrd) :X CLK
Row Cycle (Trc) :XX CLK
← → Select Screen
↑ ↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
NorthBridge Chipset Configuration		
Memory CLK	Read only	It shows the clock frequency of the installed SDRAM.
CAS Latency (Tcl)	Read only	This controls the timing delay (in clock cycles) before SDRAM starts a read command after receiving it.
RAS/CAS Delay (Trcd)	Read only	When DRAM is refreshed, both rows and columns are addressed separately. This setup item allows you to determine the timing of the transition from RAS (row address strobe) to CAS (column address strobe). The less the clock cycles, the faster the DRAM performance.

Feature	Option	Description
NorthBridge Chipset Configuration		
Min Active RAS (Tras)	Read only	This setting allows you to select the number of clock cycles allotted for the RAS pulse width, according to DRAM specifications. The less the clock cycles, the faster the DRAM performance.
Row Precharge Time (Trp)	Read only	This item controls the number of cycles for Row Address Strobe (RAS) to be allowed to precharge. If insufficient time is allowed for the RAS to accumulate its chage before DRAM refresh, refresh may be incomplete and DRAM may fail to retain data. This item applies only when synchronous DRAM is installed in the system.
RAS/RAS Delay (Trrd)	Read only	Auto uses hardware compensation values. Other values add to or subtract from hardware generated value. Recommended setting is Auto.
Row Cycle (Trc)	Read only	Bits 7-4. RAS#-active to RAS#-active or auto refresh of the same bank.

3.9.1.1 – Memory Configuration Sub-Menu

This menu has options for memory speed & latency. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

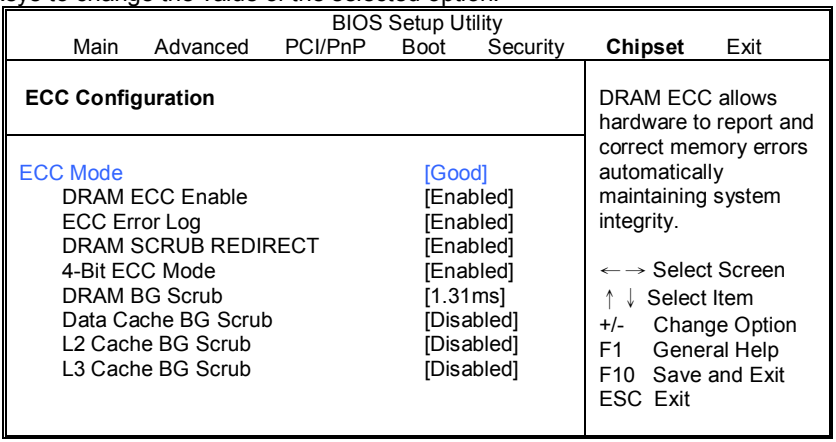

BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
Memory Configuration
Bank Interleaving [Auto]
Channel Interleaving [Auto]
MemClk Tristate C3/ATLVID [Disabled]
Memory Hole Remapping [Enabled]
CS Sparing Enable [Disabled]
Unganged Mode Support [Enabled]
Power Down Enable [Enabled]
Power Down Mode [Channel]
MEMCLK can be set by the code using AUTO, or if you use LIMIT, you can set one of the standard values.
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Memory Configuration		
Bank Interleaving	Disabled **Auto**	Enable Bank Memory Interleaving
Channel Interleaving	**Disabled** Auto Address bits 6 Address bits 12 Hash*, XOR of Address bits [20:16, 6] Hash*, XOR of Address bits [20:16, 9]	Enable Channel Interleaving
MemClk Tristate C3/ATLVID	**Disabled** Enabled	Enable/Disable MemClk Tri-Stating during C3 and Alt VID
Memory Hole Remapping	**Enabled** Disabled	Enable Memory Remapping around Memory Hole
CS Sparing Enable	**Disabled** Enabled	Reserve a spare memory rank in each node.

Unganged Mode Support	**Enabled**	Enabled : Configured to two single-channel DRAM Controllers Disabled : Configured to a single dual-channel DRAM Controller
	Disabled	
Power Down Enable	**Enabled**	Enable or disable DDR power down mode
	Disabled	
Power Down Mode	**Channel**	Set DDR power down mode
	Chip Select	

3.9.1.2 –ECC Configuration Sub-Menu

This menu allows the user to configure ECC setup for system & DRAM. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
ECC Configuration
ECC Mode [Good]
DRAM ECC Enable [Enabled]
ECC Error Log [Enabled]
DRAM SCRUB REDIRECT [Enabled]
4-Bit ECC Mode [Enabled]
DRAM BG Scrub [1.31ms]
Data Cache BG Scrub [Disabled]
L2 Cache BG Scrub [Disabled]
L3 Cache BG Scrub [Disabled]
DRAM ECC allows hardware to report and correct memory errors automatically maintaining system integrity.
←→ Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

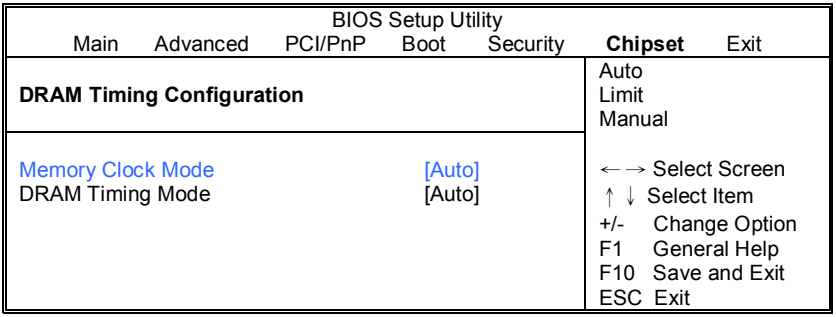
Feature	Option	Description
ECC Configuration		
ECC Mode	**Good**	Select the level of ECC protection. Note: The "Super" ECC mode dynamically sets the DRAM scrub rate so all of memory is scrubbed in 8 hours.
	Disabled	
	Basic	
	Super	
	Max	
	User	
DRAM ECC Enable	**Enabled**	DRAM ECC allows hardware to report and correct memory errors automatically maintaining system integrity.
	Disabled	
ECC Error Log	**Enabled**	Enable / Disable ECC Error Log
	Disabled	
DRAM SCRUB REDIRECT	**Enabled**	DRAM SCRUB REDIRECT allows the system to correct DRAM ECC errors immediately when they occur, even if background scrubbing is on.
	Disabled	
4-Bit ECC Mode	**Enabled**	Enable 4-Bit ECC Mode. Note: Also known as CHIPKILL ECC Mode
	Disabled	

DRAM BG Scrub	Disabled 40ns 80ns 160ns 320ns 640ns 1.28us 2.56us 5.12us 10.2us 20.5us 41.0us 81.9us 163.8us 327.7us 655.4us **1.31ms** 2.62ms 5.24ms 10.49ms 20.97ms 42.00ms 84.00ms	DRAM scrubbing corrects memory errors so later reads are correct. Doing this while memory is not being used improves performance. Note: When AMD's node interleave feature is enabled, BIOS will force DRAM scrub off.
Data Cache BG Scrub	**Disabled** 40ns 80ns 160ns 320ns 640ns 1.28us 2.56us 5.12us 10.2us 20.5us 41.0us 81.9us 163.8us 327.7us 655.4us	Allows the L1 Data Cache RAM to be corrected while idle.

L2 /L3 Cache BG Scrub	**Disabled**	Allows the L2/L3 Data Cache RAM to be corrected while idle.
	40ns	
	80ns	
	160ns	
	320ns	
	640ns	
	1.28us	
	2.56us	
	5.12us	
	10.2us	
	20.5us	
	41.0us	
	81.9us	
	163.8us	
	327.7us	
	655.4us	

3.9.1.3 DRAM Timing Configuration Sub-Menu

This menu allows the user to configure DRAM Timing. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.



Feature	Option	Description
DRAM Timing Configuration		
Memory Clock Mode	**Auto**	Select the DRAM Frequency programming method. If Auto, the DRAM speed will be based on SPDs. If Limit, the DRAM speed will not exceed the specified value. If Manual, the DRAM speed specified will be programmed by users.
	Limit	
	Manual	
DRAM Timing Mode	**Auto**	Allow users to configure the DRAM Timing manually.
	DCT 0	
	DCT 1	
	Both	

3.9.1.4 IOMMU Option Sub-Menu

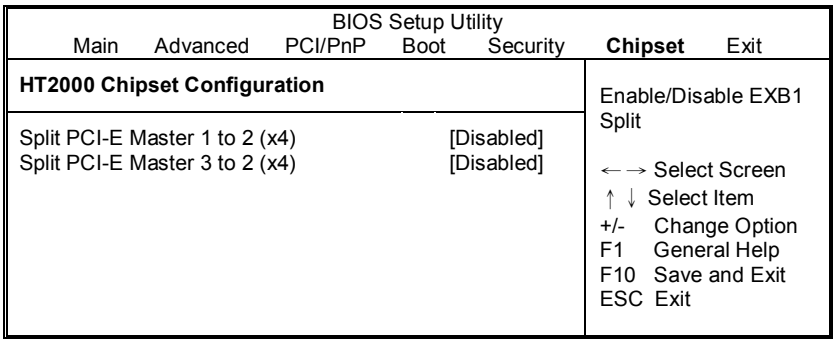
This menu has options for IOMMU. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

BIOS Setup Utility Main Advanced PCI/PnP Boot Security **Chipset** Exit	
IOMMU Mode [128MB]	Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation, If AGP is present, select appropriate option to ensure proper AGP operation. ←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit

Feature	Option	Description
IOMMU Configuration		
IOMMU Mode	AGP Present Disabled 32 MB 64 MB **128 MB** 256 MB 512 MB 1 GB	Set GART size in systems without AGP, or disable altogether. Some OSes require valid GART for proper operation. If AGP is present, select appropriate option to ensure proper AGP operation.

3.9.2 – HT2000 System I/O Configuration Sub-Menu

This menu allows the user to configure HT2000 System I/O Submenu. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.


BIOS Setup Utility
Main Advanced PCI/PnP Boot Security Chipset Exit
HT2000 Chipset Configuration
Split PCI-E Master 1 to 2 (x4) [Disabled]
Split PCI-E Master 3 to 2 (x4) [Disabled]
Enable/Disable EXB1 Split
← → Select Screen
↑ ↓ Select Item
+/- Change Option
F1 General Help
F10 Save and Exit
ESC Exit

Feature	Option	Description
Chipset Configuration		
Split PCI-E Master 1 to 2 (x4)	Enabled **Disabled**	Enabled/Disable EXB1 Split
Split PCI-E Master 3 to 2 (x4)	Enabled **Disabled**	Enabled/Disable EXB3 Split

3.9.3 – HT1000 SouthBridge Chipset Configuration Sub-Menu

This menu allows the user to enable SM Bus 2.0 controller. Use the up and down arrow (↑/↓) keys to select an item. Use the Plus and Minus (+/-) keys to change the value of the selected option.

BIOS Setup Utility Main Advanced PCI/PnP Boot Security **Chipset** Exit		
Power Control After Power Fail Resume on RTC Alarm Resume on PME# Watchdog Mode **South Bridge Chipset Configuration**	[Former State] [Disabled] [Enabled] [Disabled]	Enabled Former State ←→ Select Screen ↑ ↓ Select Item +/- Change Option F1 General Help F10 Save and Exit ESC Exit
Hide XIOAPIC PCI Functions High Performance Event Timer Power Button Install Off	[Enabled] [Disabled] [Enabled]	

Feature	Option	Description
Chipset Configuration		
Power Control After Power Fail	**Former State**	
	ON	
Resume on RTC Alarm	Enabled	
	Disabled	
Resume on PME#	**Enabled**	
	Disabled	
Watchdog Mode	**Disabled**	POST: BIOS POST Watchdog timer counting. Start at PowerON. Stop at OS boot. OS: OS boot Watchdog. Start at OS boot. PowerON: Start at PowerON.
	POST	
	OS	
	PowerON	

Feature	Option	Description
South Bridge Chipset Configuration		
Hide XIOAPIC PCI Functions	**Enabled**	Hide XIOAPIC PCI functions.
	Disabled	
High Performance Event Timer	Enabled	Enable / Disable high precision timer
	Disabled	
Power Button Install Off	**Enabled**	Disable or enable power button instant off.
	Disabled	

3.10 – BIOS Exit Menu

You can display an Exit BIOS Setup option by highlighting it Arrow (↑/↓) keys and pressing Enter.

BIOS Setup Utility Main Advanced PCI/PnP Boot Security Chipset **Exit**	
Exit Options	Exit system setup after saving the changes.
Save Changes and Exit Discard Changes and Exit Discard Charges Load Optimal Defaults Load Failsafe Defaults	F10 key can be used for this operation. ← → Select Screen ↑ ↓ Select Item Enter Go to Sub Screen F1 General Help F10 Save and Exit ESC Exit

Save Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are stored into CMOS.
System will use the new settings to boot up.

Discard Changes and Exit
Use this option to exit setup utility and re-boot.
All new selections you have made are not stored into CMOS.
System will use the old settings to boot up.

Discard Changes
Use this option to restore all new setup values that you have made but not saved into CMOS.

Load Optimal Defaults
Use this option to load default performance setup values.
Use this option when system CMOS values have been corrupted or modified incorrectly.

Load Failsafe Defaults
Use this option to load all default failsafe setup values.
Use this option when troubleshooting.

Chapter 4: Diagnostics

Note: if you experience problems with setting up your system, always check the following things in the following order:

Memory, Video, CPU

By checking these items, you will most likely find out what the problem might have been when setting up your system. For more information on troubleshooting, check the TYAN website at: http://www.tyan.com.

4.1 Beep Codes

Fatal errors, which halt the boot process, are communicated through two kinds of audible beeps.
•A single long beep followed by two short beeps: It indicates that a video error has occurred and the BIOS can't initialize the video screen to display and additional info.
•A single long beep repeatedly: This indicates that a DRAM error has occurred.
The most common type of error is a memory error.

Before contacting your vendor or TYAN Technical Support, be sure that you note as much as you can about the beep code length and order that you experience. Also, be ready with information regarding add-in cards, drives and O/S to speed the support process and come to a quicker solution.

4.2 Flash Utility

Every BIOS file is unique for the motherboard it was designed for. For Flash Utilities, BIOS downloads, and information on how to properly use the Flash Utility with your motherboard, please check the TYAN web site: http://www.tyan.com/

Note: Please be aware that by flashing your BIOS, you agree that in the event of a BIOS flash failure, you must contact your dealer for a replacement BIOS. There are no exceptions. TYAN does not have a policy for replacing BIOS chips directly with end users. In no event will TYAN be held responsible for damages done by the end user.

4.3 AMIBIOS Post Code

The POST code checkpoints are the largest set of checkpoints during the BIOS pre-boot process. The following table describes the type of checkpoints that may occur during the POST portion of the BIOS:

Checkpoint	Description
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both the 8259 compatible PICs in the system
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer.Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.
33	Initializes the silent boot module. Set the window for displaying text information.

Checkpoint	Description
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See *DIM Code Checkpoints* section of document for more information.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, … etc.) successfully installed in the system and update the BDA, EBDA…etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization of chipset registers.
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRR's.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).

NOTE

Appendix: SMDC Information

Overview

Tyan Server Management Daughter Card (SMDC) is a powerful yet cost-efficient solution for high-end server management hardware packages. Tyan's goal is to provide remote system monitoring and control even when the operating system is absence or simply fails. This empowers Tyan's server board with advanced industrial-standard features.

Tyan SMDC is a snap-in card that provides essential server management solution. It enables any IT Manager by providing multi-interfaces to access the hardware remotely and perform **monitor**, **control** and **diagnose** activities effectively.

Tyan SMDC is not a peripheral card. Unlike regular peripheral card such as AGP card, Network card or SCSI card, SMDC does not require any hardware specific driver. As long as a standby power comes into the system, SMDC will begin looking after the system.

Tyan SMDC provides diversified methods to communicate with the hardware. IT manager has the flexibility to choose among *Keyboard Controller Style* (KCS), *Block Transfer* (BT) style, Intelligent Chassis Management Bus (ICMB), Intelligent Platform Management Bus (IPMB), Emergency Management Port (EMP) and standard IPMI-Over-LAN communication as defined in latest IPMI 1.5 specification.

Tyan SMDC is compatible with all IPMI-compliance software as well as Tyan System Operator™ (TSO) software package.

By adding SMDC, Tyan's server board becomes a highly manageable and IPMI compatible system with all the advanced features suggesting in IPMI Spec.

More detailed information on Tyan's SMDC card can be found on our website: http://www.tyan.com

Features of Tyan Server Management

Monitor various system components remotely
-such as fans, processor temperature, and more

Remote power on and power off

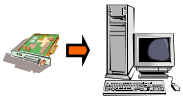
Console redirect
-the ability to view system remotely

Alert and error actions
-such as audible beep, e-mail, power down and reboot

SMDC runs on stand-by power
-the SMDC will continue to function, even if the system is not powered on

How SMDC and TSO Work

The brief descriptions below will help explain how these items function.

	Agent – a system with SMDC installed The SMDC is installed in the Agent system that uses a compatible/supported Tyan motherboard.
	Manager – manages the Agent The Manger is set up to manage the Agent that has the SMDC. The Manager and Agent should be located in the same place.
	Console – communicates with Manager The Console is used to monitor and control the Agent through the Manager.

Glossary

ACPI (Advanced Configuration and Power Interface): a power management specification that allows the operating system to control the amount of power distributed to the computer's devices. Devices not in use can be turned off, reducing unnecessary power expenditure.

AGP (Accelerated Graphics Port): a PCI-based interface which was designed specifically for demands of 3D graphics applications. The 32-bit AGP channel directly links the graphics controller to the main memory. While the channel runs only at 66 MHz, it supports data transmission during both the rising and falling ends of the clock cycle, yielding an effective speed of 133 MHz.

ATAPI (AT Attachment Packet Interface): also known as IDE or ATA; a drive implementation that includes the disk controller on the device itself. It allows CD-ROMs and tape drives to be configured as master or slave devices, just like HDDs.

ATX: the form factor designed to replace the AT form factor. It improves on the AT design by rotating the board 90 degrees, so that the IDE connectors are closer to the drive bays, and the CPU is closer to the power supply and cooling fan. The keyboard, mouse, USB, serial, and parallel ports are built-in.

Bandwidth: refers to carrying capacity. The greater the bandwidth, the more data the bus, phone line, or other electrical path can carry. Greater bandwidth results in greater speed.

BBS (BIOS Boot Specification): a feature within the BIOS that creates, prioritizes, and maintains a list of all Initial Program Load (IPL) devices, and then stores that list in NVRAM. IPL devices have the ability to load and execute an OS, as well as provide the ability to return to the BIOS if the OS load process fails. At that point, the next IPL device is called upon to attempt loading of the OS.

BIOS (Basic Input/Output System): the program that resides in the ROM chip, which provides the basic instructions for controlling your computer's hardware. Both the operating system and application software use BIOS routines to ensure compatibility.

Buffer: a portion of RAM which is used to temporarily store data; usually from an application though it is also used when printing and in most keyboard drivers. The CPU can manipulate data in a buffer before copying it to a disk drive. While this improves system performance (reading to or writing from a disk drive a single time is much faster than doing so repeatedly) there is the possibility of

losing your data should the system crash. Information in a buffer is temporarily stored, not permanently saved.

Bus: a data pathway. The term is used especially to refer to the connection between the processor and system memory, and between the processor and PCI or ISA local buses.

Bus mastering: allows peripheral devices and IDEs to access the system memory without going through the CPU (similar to DMA channels).

Cache: a temporary storage area for data that will be needed often by an application. Using a cache lowers data access times since the information is stored in SRAM instead of slower DRAM. Note that the cache is also much smaller than your regular memory: a typical cache size is 512KB, while you may have as much as 4GB of regular memory.

Closed and open jumpers: jumpers and jumper pins are active when they are "on" or "closed", and inactive when they are "off" or "open".

CMOS (Complementary Metal-Oxide Semiconductors): chips that hold the basic startup information for the BIOS.

COM port: another name for the serial port, which is called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another). Parallel ports transmit the bits of a byte on eight different wires at the same time (that is, in parallel form, eight bits at the same time).

DDR (Double Data Rate): a technology designed to double the clock speed of the memory. It activates output on both the rising and falling edge of the system clock rather than on just the rising edge, potentially doubling output.

DIMM (Dual In-line Memory Module): faster and more capacious form of RAM than SIMMs, and do not need to be installed in pairs.

DIMM bank: sometimes called DIMM socket because the physical slot and the logical unit are the same. That is, one DIMM module fits into one DIMM socket, which is capable of acting as a memory bank.

DMA (Direct Memory Access): channels that are similar to IRQs. DMA channels allow hardware devices (like soundcards or keyboards) to access the main memory without involving the CPU. This frees up CPU resources for other tasks. As with IRQs, it is vital that you do not double up devices on a single line. Plug-n-Play devices will take care of this for you.

DRAM (Dynamic RAM): widely available, very affordable form of RAM which looses data if it is not recharged regularly (every few milliseconds). This refresh requirement makes DRAM three to ten times slower than non-recharged RAM such as SRAM.

ECC (Error Correction Code or Error Checking and Correcting): allows data to be checked for errors during run-time. Errors can subsequently be corrected at the same time that they're found.

EEPROM (Electrically Erasable Programmable ROM): also called Flash BIOS, it is a ROM chip which can, unlike normal ROM, be updated. This allows you to keep up with changes in the BIOS programs without having to buy a new chip. TYAN's BIOS updates can be found at http://www.tyan.com

ESCD (Extended System Configuration Data): a format for storing information about Plug-n-Play devices in the system BIOS. This information helps properly configure the system each time it boots.

Firmware: low-level software that controls the system hardware.

Form factor: an industry term for the size, shape, power supply type, and external connector type of the Personal Computer Board (PCB) or motherboard. The standard form factors are the AT and ATX.

Global timer: onboard hardware timer, such as the Real-Time Clock (RTC).

HDD: stands for Hard Disk Drive, a type of fixed drive.

H-SYNC: controls the horizontal synchronization/properties of the monitor.

HyperTransport™: a high speed, low latency, scalable point-to-point link for interconnecting ICs on boards. It can be significantly faster than a PCI bus for an equivalent number of pins. It provides the bandwidth and flexibility critical for today's networking and computing platforms while retaining the fundamental programming model of PCI.

IC (Integrated Circuit): the formal name for the computer chip.

IDE (Integrated Device/Drive Electronics): a simple, self-contained HDD interface. It can handle drives up to 8.4 GB in size. Almost all IDEs sold now are in fact Enhanced IDEs (EIDEs), with maximum capacity determined by the hardware controller.

I/O (Input/Output): the connection between your computer and another piece of hardware (mouse, keyboard, etc.)

IRQ (Interrupt Request): an electronic request that runs from a hardware device to the CPU. The interrupt controller assigns priorities to incoming requests and delivers them to the CPU. It is important that there is only one device hooked up to each IRQ line; doubling up devices on IRQ lines can lock up your system. Plug-n-Play operating systems can take care of these details for you.

Latency: the amount of time that one part of a system spends waiting for another part to catch up. This occurs most commonly when the system sends data out to a peripheral device and has to wait for the peripheral to spread (peripherals tend to be slower than onboard system components).

NVRAM: ROM and EEPROM are both examples of Non-Volatile RAM, memory that holds its data without power. DRAM, in contrast, is volatile.

Parallel port: transmits the bits of a byte on eight different wires at the same time.

PCI (Peripheral Component Interconnect): a 32 or 64-bit local bus (data pathway) which is faster than the ISA bus. Local buses are those which operate within a single system (as opposed to a network bus, which connects multiple systems).

PCI PIO (PCI Programmable Input/Output) modes: the data transfer modes used by IDE drives. These modes use the CPU for data transfer (in contrast, DMA channels do not). PCI refers to the type of bus used by these modes to communicate with the CPU.

PCI-to-PCI bridge: allows you to connect multiple PCI devices onto one PCI slot.

PM timers (Power Management timers): software timers that count down the number of seconds or minutes until the system times out and enters sleep, suspend, or doze mode.

PnP (Plug-n-Play): a design standard that has become ascendant in the industry. Plug-n-Play devices require little set-up to use. Devices and operating systems that are not Plug-n-Play require you to reconfigure your system each time you add or change any part of your hardware.

PXE (Preboot Execution Environment): one of four components that together make up the Wired for Management 2.0 baseline specification. PXE was designed to define a standard set of preboot protocol services within a client with the goal of allowing networked-based booting to boot using industry standard protocols.

RAID (Redundant Array of Independent Disks): a way for the same data to be stored in different places on many hard drives. By using this method, the data is stored redundantly and multiple hard drives will appear as a single drive to the operating system. RAID level 0 is known as striping, where data is striped (or overlapped) across multiple hard drives, but offers no fault-tolerance. RAID level 1 is known as mirroring, which stores the data within at least two hard drives, but does not stripe. RAID level 1 also allows for faster access time and fault-tolerance, since either hard drive can be read at the same time. RAID level 0+1 is both striping and mirroring, providing fault-tolerance, striping, and faster access all at the same time.

RAIDIOS: RAID I/O Steering (Intel)

RAM (Random Access Memory): technically refers to a type of memory where any byte can be accessed without touching the adjacent data and is often referred to the system's main memory. This memory is available to any program running on the computer.

ROM (Read-Only Memory): a storage chip which contains the BIOS; the basic instructions required to boot the computer and start up the operating system.

SDRAM (Synchronous Dynamic RAM): called as such because it can keep two sets of memory addresses open simultaneously. By transferring data alternately from one set of addresses and then the other, SDRAM cuts down on the delays associated with non-synchronous RAM, which must close one address bank before opening the next.

Serial port: called as such because it transmits the eight bits of a byte of data along one wire, and receives data on another single wire (that is, the data is transmitted in serial form, one bit after another).

Sleep/Suspend mode: in this mode, all devices except the CPU shut down.

SDRAM (Static RAM): unlike DRAM, this type of RAM does not need to be refreshed in order to prevent data loss. Thus, it is faster and more expensive.

Standby mode: in this mode, the video and hard drives shut down; all other devices continue to operate normally.

UltraDMA-33/66/100: a fast version of the old DMA channel. UltraDMA is also called UltraATA. Without a proper UltraDMA controller, your system cannot take advantage of higher data transfer rates of the new UltraDMA/UltraATA hard drives.

USB (Universal Serial Bus): a versatile port. This one port type can function as a serial, parallel, mouse, keyboard or joystick port. It is fast enough to

support video transfer, and is capable of supporting up to 127 daisy-chained peripheral devices.

VGA (Video Graphics Array): the PC video display standard

V-SYNC: controls the vertical scanning properties of the monitor.

ZCR (Zero Channel RAID): PCI card that allows a RAID card to use the onboard SCSI chip, thus lowering cost of RAID solution

ZIF Socket (Zero Insertion Force socket): these sockets make it possible to insert CPUs without damaging the sensitive CPU pins. The CPU is lightly placed in an open ZIF socket, and a lever is pulled down. This shifts the processor over and down, guiding it into the board and locking it into place.

Technical Support

If a problem arises with your system, you should turn to your dealer for help first. Your system has most likely been configured by them, and they should have the best idea of what hardware and software your system contains. Furthermore, if you purchased your system from a dealer near you, you can bring your system to them to have it serviced instead of attempting to do so yourself (which can have expensive consequences).

If these options are not available for you then Tyan Computer Corporation can help. Besides designing innovative and quality products for over a decade, Tyan has continuously offered customers service beyond their expectations. Tyan's website (**www.tyan.com**) provides easy-to-access resources such as in-depth Linux Online Support sections with downloadable Linux drivers and comprehensive compatibility reports for chassis, memory and much more. With all these convenient resources just a few keystrokes away, users can easily find the latest software and operating system components to keep their systems running as powerful and productive as possible. Tyan also ranks high for its commitment to fast and friendly customer support through email. By offering plenty of options for users, Tyan serves multiple market segments with the industry's most competitive services to support them.

"Tyan's tech support is some of the most impressive we've seen, with great response time and exceptional organization in general" - Anandtech.com

Please feel free to contact us directly for this service at techsupport@tyan.com

Help Resources:

1. See the beep codes section of this manual.
2. See the TYAN website for FAQ's, bulletins, driver updates, and other information: http://www.tyan.com
3. Contact your dealer for help BEFORE calling TYAN.
4. Check the TYAN user group: alt.comp.periphs.mainboard.TYAN

Returning Merchandise for Service

During the warranty period, contact your distributor or system vendor FIRST for any product problems. This warranty only covers normal customer use and does not cover damages incurred during shipping or failure due to the alteration, misuse, abuse, or improper maintenance of products.

NOTE: A receipt or copy of your invoice marked with the date of purchase is required before any warranty service can be rendered. You may obtain service by calling the manufacturer for a Return Merchandise Authorization (RMA) number. The RMA number should be prominently displayed on the outside of the shipping carton and the package should be mailed prepaid. TYAN will pay to have the board shipped back to you.

Notice for the USA
Compliance Information Statement (Declaration of Conformity Procedure) DoC
FCC Part 15: This device complies with part 15 of the FCC Rules

Operation is subject to the following conditions:

This device may not cause harmful interference, and
This device must accept any interference received including interference that may cause undesired operation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try one or more of the following measures:

Reorient or relocate the receiving antenna.
Increase the separation between the equipment and the receiver.
Plug the equipment into an outlet on a circuit different from that of the receiver.
Consult the dealer on an experienced radio/television technician for help.

Notice for Canada
This apparatus complies with the Class B limits for radio interference as specified in the Canadian Department of Communications Radio Interference Regulations. (Cet appareil est conforme aux norms de Classe B d'interference radio tel que specifie par le Ministere Canadien des Communications dans les reglements d'ineteference radio.)

Notice for Europe (CE Mark)
This product is in conformity with the Council Directive 89/336/EEC, 92/31/EEC (EMC).

CAUTION: Lithium battery included with this board. Do not puncture, mutilate, or dispose of battery in fire. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by manufacturer. Dispose of used battery according to manufacturer instructions and in accordance with your local regulations.